Correlation of Texas Essential Knowledge and Skills for Mathematics (TEKS) to i-Ready Diagnostic

Grade K

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
K.2.A count forward . . . to at least 20 with . . . objects;	Count up to 20 objects arranged in a line, rectangular array, a circle, or a scattered configuration.
K.2.A count forward and backward to at least 20 with and without objects;	Count forward by 1s from any number less than 100.* Count backward from 10 to 0.* Count by 1s to 100.* Count backward by 1s from any number less than 100.*
K.2.B read, write, and represent whole numbers from 0 to at least 20 with and without objects or pictures;	Recognize numerals to 10.* Express numbers from 11 to 19 using tens and ones.* Recognize numerals up to 100.* Use base-ten models to represent a two-digit number and identify the corresponding numeral.*
K.2.C count a set of objects up to at least 20 and demonstrate that the last number said tells the number of objects in the set regardless of their arrangement or order;	Count up to 20 objects arranged in a line, rectangular array, a circle, or a scattered configuration.
K.2.E generate a set using concrete and pictorial models that represents a number that is . . . equal to a given number up to 20;	Given a number from 1-20, make a set of up to 20 objects.
K.2.E generate a set using concrete and pictorial models that represents a number that is more than, less than, and equal to a given number up to 20;	Identify the number that is one more than a given number to ten.* Identify the number that is one less than a given number to ten.*

**This skill is related to the aligned standard*

Correlation of Texas Essential Knowledge and Skills for Mathematics (TEKS) to i-Ready Diagnostic (continued)

Grade K (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
K.2.F generate a number that is . . . one less than another number up to at least 20;	Identify the number that is one less than a given number to ten.
K.2.F generate a number that is one more than . . . another number up to at least 20;	Identify the number that is one more than a given number to ten.
K.2.G compare sets of objects up to at least 20 in each set using comparative language;	Compare two sets with up to 20 objects.
K.2.H use comparative language to describe two numbers up to 20 presented as written numerals; and	Compare two written numerals from 1 to 10.*
K.2.I compose and decompose numbers up to 10 with objects and pictures.	Express numbers from 11 to 19 using tens and ones.*
K.3.A model the action of . . . separating to represent subtraction;	Represent subtraction within 10 with objects, drawings, expressions, and equations.
K.3.A model the action of joining to represent addition . . .	Represent addition within 10 with objects, drawings, expressions, and equations.
K.3.A model the action of joining to represent addition and the action of separating to represent subtraction;	Use equations to solve joining problems with numbers to 10.* Use equations to solve take away problems with numbers to 10.* Solve subtraction problems for separation or take away situations.*
K.3.B solve word problems using objects and drawings to find . . . differences within 10; and	Solve subtraction word problems within 10.
K.3.B solve word problems using objects and drawings to find sums up to 10 . . .	Solve addition word problems within 10.
K.3.B solve word problems using objects and drawings to find sums up to 10 and differences within 10; and	Use equations to solve joining problems with numbers to 10.* Solve addition problems by counting on with numbers to 10.*

**This skill is related to the aligned standard*

Correlation of Texas Essential Knowledge and Skills for Mathematics (TEKS) to i-Ready Diagnostic (continued)

Grade K (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	Use equations to solve take away problems with numbers to 10.* Solve addition problems by counting on.* Solve subtraction problems for separation or take away situations.*
K.3.C . . . solve problems involving . . . subtracting within 10 using . . . number sentences.	Use equations to solve take away problems with numbers to 10.
K.3.C . . . solve problems involving adding . . . within 10 using . . . number sentences.	Use equations to solve joining problems with numbers to 10.
K.3.C explain the strategies used to solve problems involving adding and subtracting within 10 using spoken words, concrete and pictorial models, and number sentences.	Solve addition problems by counting on with numbers to 10.* Solve addition problems by counting on.* Solve subtraction problems for separation or take away situations.* Solve addition problems for combining, joining, or comparison situations.* Build equations to represent real-world subtraction problems involving take from, take apart, or comparison situations. * Relate addition and subtraction to part-part-whole concepts.*
K.6.A identify two-dimensional shapes, including circles, triangles, rectangles, and squares as special rectangles;	Identify basic two-dimensional shapes (square, circle, rectangle, triangle), including two-dimensional shapes modeled by real-world objects.

**This skill is related to the aligned standard*

Grade K (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
K.6.B identify three-dimensional solids, including cylinders, cones, spheres, and cubes, in the real world;	Identify basic three-dimensional shapes (cube, cone, cylinder, sphere), including three-dimensional shapes modeled by real-world objects. Identify shapes as two-dimensional ("flat") or three-dimensional ("solid").
K.6.C identify two-dimensional components of three-dimensional objects;	Identify basic two-dimensional shapes (square, circle, rectangle, triangle), including two-dimensional shapes modeled by real-world objects.* Identify basic three-dimensional shapes (cube, cone, cylinder, sphere), including three-dimensional shapes modeled by real-world objects.* Identify defining attributes of two-dimensional shapes.*
K.6.D identify attributes of two-dimensional shapes using informal and formal geometric language interchangeably;	Identify defining attributes of two-dimensional shapes. Identify shapes as two-dimensional ("flat") or three-dimensional ("solid"). Describe parts of two-dimensional shapes using informal language such as the number of sides and corners.* Compare, contrast, and classify attributes of two-dimensional shapes (circle, square, rectangle, triangle, hexagon) and three-dimensional shapes (cube, cone, cylinder, sphere).*
K.6.E classify and sort a variety of regular and irregular two- and three-dimensional figures regardless of orientation or size; and	Compare, contrast, and classify attributes of two-dimensional shapes (circle, square, rectangle, triangle, hexagon) and three-

Grade K (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	dimensional shapes (cube, cone, cylinder, sphere). Identify defining attributes of two-dimensional shapes.*
K.6.F create two-dimensional shapes using a variety of materials and drawings.	Identify basic two-dimensional shapes (square, circle, rectangle, triangle), including two-dimensional shapes modeled by real-world objects.* Identify defining attributes of two-dimensional shapes.*
K.7.A give an example of a measurable attribute of a given object, including length, capacity, and weight; and	Identify measurable attributes of objects using informal language (how long, wide, thick, deep, short or tall they are, or how much they weigh or hold). Describe how objects may be measured or categorized.* Compare measures of familiar objects.* Directly compare the length of two objects and describe the difference (longer, taller, shorter, thicker).* Directly compare the weight of two objects and describe the difference (heavier, lighter).*
K.7.B compare two objects with a common measurable attribute . . . and describe the difference.	Compare, contrast, and classify attributes of two-dimensional shapes (circle, square, rectangle, triangle, hexagon) and three-dimensional shapes (cube, cone, cylinder, sphere).
K.7.B compare two objects with a common measurable attribute to see which object has	Compare measures of familiar objects.

Grade K (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
more of/less of the attribute and describe the difference.	Directly compare the length of two objects and describe the difference (longer, taller, shorter, thicker). Directly compare the weight of two objects and describe the difference (heavier, lighter).
K.8.A . . . sort, and organize data into two or three categories;	Classify objects into given categories; count the numbers of objects in each category and sort the categories by count.
K.8.A collect, sort, and organize data into two or three categories;	Organize, represent, and interpret several categories of data in a picture or bar graph with up to 3 categories.*
K.8.B use data to create real-object and picture graphs; and	Organize, represent, and interpret several categories of data in a picture or bar graph with up to 3 categories.*
K.8.C draw conclusions from real-object and picture graphs.	Organize, represent, and interpret several categories of data in a picture or bar graph with up to 3 categories.*

Grade 1

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
1.2.B use concrete and pictorial models to compose and decompose numbers up to 120 in more than one way as so many hundreds, so many tens, and so many ones;	Use base-ten models to represent a two-digit number and identify the corresponding numeral.* Express numbers from 11 to 19 using tens and ones.* Read and write whole numbers through hundreds using number words, standard form, and expanded form.*
1.2.C use objects . . . to represent numbers up to 120;	Use base-ten models to represent a two-digit number and identify the corresponding numeral.
1.2.C use objects, pictures, and expanded and standard forms to represent numbers up to 120;	Recognize numerals up to 100.* Express numbers from 11 to 19 using tens and ones.* Read and write whole numbers through hundreds using number words, standard form, and expanded form.*
1.2.D generate a number that is greater than or less than a given whole number up to 120;	Identify the number that is one more than a given number to ten.* Identify the number that is one less than a given number to ten.*
1.2.E use place value to compare whole numbers up to 120 using comparative language;	Compare and order two-digit numbers.* Compare and order three-digit numbers.*
1.2.F order whole numbers up to 120 using place value and open number lines; and	Compare and order two-digit numbers.* Compare and order three-digit numbers.*
1.2.G represent the comparison of two numbers to 100 using the symbols >, <, or =.	Compare two numbers to 100 using the symbols >, <, or =.

**This skill is related to the aligned standard*

Grade 1 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	Compare and order two-digit numbers.* Compare and order three-digit numbers.*
1.3.B use objects and pictorial models to solve word problems involving joining, separating, and comparing sets within 20 and unknowns as any one of the terms in the problem such as 2 + 4 = [ ]; 3 + [ ] = 7; and 5 = [ ] - 3;	Solve subtraction problems for separation or take away situations.* Build equations to represent real-world addition problems, recognizing that the order of addends does not affect the sum.* Use equations to solve joining problems with numbers to 10.* Use equations to solve take away problems with numbers to 10.* Represent and determine the unknown number in an addition or subtraction equation.* Build equations to represent real-world subtraction problems involving take from, take apart, or comparison situations. * Solve addition problems for combining, joining, or comparison situations.*
1.3.C compose 10 with two . . . addends . . .	Find combinations of 10 and identify missing addends.
1.3.C compose 10 with two or more addends with and without concrete objects;	Solve addition problems by counting on with numbers to 10.*
1.3.D apply basic fact strategies to . . . subtract within 20 . . .	Subtract within 20.
1.3.D apply basic fact strategies to add . . . within 20 . . .	Add within 20.

**This skill is related to the aligned standard*

Grade 1 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
1.3.D apply basic fact strategies to add and subtract within 20, including making 10 and decomposing a number leading to a 10;	Solve addition problems by counting on.* Identify and find sums for doubles addition facts.* Solve subtraction problems for separation or take away situations.* Solve basic subtraction facts by counting back to subtract 1, 2, or 3.* Solve basic subtraction facts by counting on.* Solve subtraction problems for separation or take away situations and check the solution using addition.* Use addition to check subtraction equations for part-part-whole situations.* Solve subtraction problems for comparison situations.* Solve subtraction problems by counting back 1, 2, or 3.* Solve subtraction problems by counting on.* Know addition/subtraction fact families.*
1.3.E explain strategies used to solve addition and subtraction problems up to 20 using spoken words, objects, pictorial models, and number sentences; and	Solve addition problems by counting on.* Identify and find sums for doubles addition facts.*

**This skill is related to the aligned standard*

Grade 1 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	Solve subtraction problems for separation or take away situations.* Solve basic subtraction facts by counting back to subtract 1, 2, or 3.* Solve basic subtraction facts by counting on.*
1.3.F generate and solve problem situations when given a number sentence involving addition . . . of numbers within 20.	Build equations to represent real-world addition problems, recognizing that the order of addends does not affect the sum.
1.3.F generate and solve problem situations when given a number sentence involving addition or subtraction of numbers within 20.	Demonstrate an understanding of the equal sign and determine if equations involving addition and subtraction are true or false.* Represent and determine the unknown number in an addition or subtraction equation.* Use addition to check subtraction equations for part-part-whole situations.* Solve addition problems by counting on with numbers to 10.*
1.4.A identify U.S. coins, including pennies, nickels, dimes, and quarters, by value and describe the relationships among them;	Identify and compare the values of coin combinations (pennies, nickels, dimes, quarters).*
1.4.B write a number with the cent symbol to describe the value of a coin; and	Identify and compare the values of coin combinations (pennies, nickels, dimes, quarters).*
1.4.C use relationships to count by twos, fives, and tens to determine the value of a collection of pennies, nickels, and/or dimes.	Count by 2s to 20 using a chart or models.* Count by 5s to 100 using a chart or models.* Count and group by 2s, 5s, and 10s to 100.*

Grade 1 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	Count by 10s to 100.*
1.5.A recite numbers . . . backward from any given number between 1 and 120;	Count backward by 1s from any number less than 100.
1.5.A recite numbers forward . . . from any given number between 1 and 120;	Count forward from any number to 120.
1.5.A recite numbers forward and backward from any given number between 1 and 120;	Count by 1s to 100.*
1.5.B skip count by . . . tens to determine the total number of objects up to 120 in a set;	Count by 2s to 20 using a chart or models.
1.5.B skip count by twos, fives, and tens to determine the total number of objects up to 120 in a set;	Count and group by 2s, 5s, and 10s to 100. Count by 10s to 100.* Count by 5s to 100 using a chart or models.* Count and skip-count by 5s, 10s, and 100s to 1,000.* Count, read, write, and represent numbers from 1 to 120.*
1.5.C . . . determine the number that is 10 more and 10 less than a given number . . .	Find 10 more or 10 less than a given number within 100.
1.5.C use relationships to determine the number that is . . . 10 less than a given number up to 120;	Subtract multiples of 10 from two-digit numbers, including multiples of 10.
1.5.D represent word problems involving . . . subtraction of whole numbers up to 20 using . . . number sentences;	Build equations to represent real-world subtraction problems involving take from, take apart, or comparison situations.
1.5.D represent word problems involving addition . . . of whole numbers up to 20 using . . . number sentences;	Build equations to represent real-world addition problems, recognizing that the order of addends does not affect the sum.

**This skill is related to the aligned standard*

Grade 1 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
1.5.D represent word problems involving addition and subtraction of whole numbers up to 20 using concrete and pictorial models and number sentences;	Solve addition problems by counting on.* Identify and find sums for doubles addition facts.* Solve subtraction problems for separation or take away situations.* Solve basic subtraction facts by counting back to subtract 1, 2, or 3.* Solve basic subtraction facts by counting on.* Solve subtraction problems for separation or take away situations and check the solution using addition.* Use addition to check subtraction equations for part-part-whole situations.* Solve subtraction problems for comparison situations.* Solve subtraction problems by counting back 1, 2, or 3.* Solve subtraction problems by counting on.* Solve word problems involving the addition of three whole numbers whose sum is less than or equal to 20 using drawings, objects, or equations.*
1.5.E understand that the equal sign represents a relationship where expressions	Demonstrate an understanding of the equal sign and determine if equations involving addition and subtraction are true or false.

**This skill is related to the aligned standard*

Grade 1 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
on each side of the equal sign represent the same value(s);	
1.5.F [represent and] determine the unknown whole number in an addition or subtraction equation when the unknown may be any one of the three . . . terms in the equation; and	Represent and determine the unknown number in an addition or subtraction equation.
1.5.G apply properties of operations to add and subtract two or three numbers.	Demonstrate an understanding of the commutative and associative properties without using the terms associative and commutative. Represent and determine the unknown number in an addition or subtraction equation.*
1.6.A classify and sort regular and irregular two-dimensional shapes based on attributes using informal geometric language;	Use attributes, including vertices, angles, and sides, to identify, describe, sort, and classify two-dimensional shapes. Compare, contrast, and classify attributes of two-dimensional shapes (circle, square, rectangle, triangle, hexagon) and three-dimensional shapes (cube, cone, cylinder, sphere).* Describe parts of two-dimensional shapes using informal language such as the number of sides and corners.*
1.6.B distinguish between attributes that define a two-dimensional . . . and attributes that do not define the shape;	Identify defining attributes of two-dimensional shapes.
1.6.B distinguish between attributes that define a two-dimensional or three-dimensional figure and attributes that do not define the shape;	Identify defining attributes of three-dimensional shapes. Identify basic three-dimensional shapes (cube, cone, cylinder, sphere), including

Grade 1 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	three-dimensional shapes modeled by real-world objects.*
1.6.D identify two-dimensional shapes, including circles, triangles, rectangles, and squares . . .	Identify basic two-dimensional shapes (square, circle, rectangle, triangle), including two-dimensional shapes modeled by real-world objects.
1.6.D identify two-dimensional shapes, including circles, triangles, rectangles, and squares, as special rectangles, rhombuses, and hexagons and describe their attributes using formal geometric language;	Identify defining attributes of two-dimensional shapes.*
1.6.E identify three-dimensional solids, including spheres, cones, cylinders, rectangular prisms (including cubes) . . .	Identify basic three-dimensional shapes (cube, cone, cylinder, sphere), including three-dimensional shapes modeled by real-world objects.
1.6.E identify three-dimensional solids, including spheres, cones, cylinders, [and] rectangular prisms (including cubes) . . . and . . . their attributes . . .	Identify defining attributes of three-dimensional shapes.
1.6.F compose two-dimensional shapes by joining two, three, or four figures to produce a target shape in more than one way if possible;	Combine and separate two-dimensional shapes to create other two-dimensional shapes and predict the results.*
1.6.G partition two-dimensional figures into two and four fair shares or equal parts and describe the parts using words; and	Describe equal parts of circles, rectangles, and squares using terms such as *halves*, *fourths*, and *quarters*. Partition circles and rectangles into halves and fourths, describe the shares using the words *halves*, *fourths*, and *quarters*, and use the phrases *half of*, *fourth of*, and *quarter of*.
1.6.H identify examples and non-examples of halves and fourths.	Describe equal parts of circles, rectangles, and squares using terms such as *halves*, *fourths*, and *quarters*.

Grade 1 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
1.7.A use measuring tools to measure the length of objects to reinforce the continuous nature of linear measurement;	Use a ruler to measure length in inches.* Use a ruler to measure length in centimeters.*
1.7.B illustrate that the length of an object is the number of same-size units of length that, when laid end-to-end with no gaps or overlaps, reach from one end of the object to the other;	Express length using whole number non-standard units.* Use a ruler to measure length in inches.*
1.7.C measure the same object/distance with units of two different lengths and describe how and why the measurements differ;	Choose the best unit to measure length: inches, feet, or yards.* Choose the best unit to measure length: centimeters or meters.*
1.7.D describe a length to the nearest whole unit using a number and a unit; and	Use a ruler to measure length in inches.*
1.7.E tell time to the hour and half hour using analog and digital clocks.	Tell time to the hour and half hour on an analog clock or a digital clock. Tell time to the nearest five minutes.*
1.8.B use data to create . . . bar-type graphs; and	Construct a bar graph with a single-unit scale to represent data that includes multiple categories, and solve simple joining, separating, and comparing problems based on the data displayed.
1.8.B use data to create picture . . . graphs; and	Create or interpret a picture graph with a single-unit scale to represent data that include multiple categories.
1.8.C draw conclusions and generate and answer questions using information from picture and bar-type graphs.	Create or interpret a picture graph with a single-unit scale to represent data that include multiple categories.* Construct a bar graph with a single-unit scale to represent data that includes multiple categories, and solve simple joining,

**This skill is related to the aligned standard*

Grade 1 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	separating, and comparing problems based on the data displayed.*

Grade 2

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
2.2.A use concrete and pictorial models to compose and decompose numbers up to 1,200 in more than one way as a sum of so many thousands, hundreds, tens, and ones;	Model three-digit numbers.* Identify the value of the digits in three-digit numbers.* Read and write whole numbers through thousands in expanded form and standard form and identify the value of the digits.* Read and write whole numbers through hundreds using number words, standard form, and expanded form.*
2.2.B use standard, word, and expanded forms to represent numbers up to 1,200;	Read and write whole numbers through thousands in expanded form and standard form and identify the value of the digits.*
2.2.C generate a number that is greater than or less than a given whole number up to 1,200;	Identify a number that is greater than or less than a given number. Compare and order three-digit numbers.*
2.2.D use place value to compare and order whole numbers up to 1,200 using comparative language, numbers, and symbols (>, <, or =);	Compare and order three-digit numbers.*
2.3.A partition objects into equal parts and name the parts, including halves, fourths, and eighths, using words;	Partition objects into equal parts and identify the parts using the terms *halves*, *fourths*, and *eighths*. Identify non-examples of objects partitioned into halves, fourths, and eighths. Identify fractions (1/2, 1/4, 3/4) as parts of a whole using pictures.* Identify fractions that name part of a set (denominators of 2, 3, 4, 6, 8, 10, 12).*

**This skill is related to the aligned standard*

Grade 2 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	Partition circles and rectangles into two, three, or four equal shares and describe the shares or whole using words (*halves, thirds, fourths, two halves, three thirds, four fourths*.)* Identify equal parts of the same whole circle, rectangle, or square partitioned in different ways, using terms such as *halves*, *thirds*, and *fourths*.*
2.3.B explain that the more fractional parts used to make a whole, the smaller the part; and the fewer the fractional parts, the larger the part;	Use models to find equivalent fractions.*
2.3.C use concrete models to count fractional parts beyond one whole using words and recognize how many parts it takes to equal one whole; and	Express whole numbers as fractions and identify fractions that are equivalent to whole numbers.*
2.3.D identify examples and non-examples of halves, fourths, and eighths.	Identify fractions (1/2, 1/4, 3/4) as parts of a whole using pictures. Partition objects into equal parts and identify the parts using the terms *halves*, *fourths*, and *eighths*. Identify non-examples of objects partitioned into halves, fourths, and eighths.
2.4.A recall basic facts to . . . subtract within 20 with automaticity;	Subtract within 20.
2.4.A recall basic facts to add . . . within 20 with automaticity;	Add within 20.
2.4.B add up to four two-digit numbers and subtract two-digit numbers using mental strategies and algorithms based on knowledge of place value and properties of operations;	Add two-digit numbers with regrouping.* Subtract two-digit numbers with regrouping.*

Grade 2 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	Subtract two-digit numbers without regrouping.* Add three or four two-digit numbers with regrouping.* Mentally add 10 or 100 to a given number 100-900, and mentally subtract 10 or 100 from a given number 100-900.* Explain why addition and subtraction strategies work using place value and the properties of operations. *
2.4.C solve one-step and multi-step word problems involving addition and subtraction within 1,000 using a variety of strategies based on place value, including algorithms; and	Add 3 one-digit numbers.* Add a two-digit number and a one-digit number.* Add two-digit numbers without regrouping.* Subtract multiples of 10 from two-digit numbers, including multiples of 10.* Add two-digit numbers with regrouping.* Subtract a one-digit number from a two-digit number.* Subtract two-digit numbers with regrouping.* Subtract two-digit numbers without regrouping.* Add three-digit numbers with regrouping.*

**This skill is related to the aligned standard*

Grade 2 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	Subtract three-digit numbers with regrouping.*
2.4.D generate and solve problem situations for a given mathematical number sentence involving addition and subtraction of whole numbers within 1,000.	Use addition to check subtraction equations for part-part-whole situations.*
2.5.A determine the value of a collection of coins up to one dollar; and	Identify and compare the values of coin combinations (pennies, nickels, dimes, quarters).*
2.5.B use the cent symbol, dollar sign, and the decimal point to name the value of a collection of coins.	Solve problems involving counting dollar bills and coins, and use the dollar symbol.* Identify and compare the values of coin combinations (pennies, nickels, dimes, quarters).*
2.6.A model, create, and describe contextual multiplication situations in which equivalent sets of concrete objects are joined; and	Model, create, and describe multiplication and division situations. Write multiplication sentences to represent equal groups and repeated addition.*
2.6.B model, create, and describe contextual division situations in which a set of concrete objects is separated into equivalent sets.	Model, create, and describe multiplication and division situations. Solve problems involving partitioning in equal groups, including identifying the remainder.*
2.7.A determine whether a number up to 40 is even or odd using pairings of objects to represent the number;	Demonstrate an understanding that a group of objects is an even number of objects if it can be divided into complete pairs and is odd if it cannot; express even numbers as doubles facts. Identify odd and even numbers up to 20.*
2.7.B use an understanding of place value to determine the number that is 10 or 100	Identify the value of the digits in three-digit numbers.*

Grade 2 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
more or less than a given number up to 1,200; and	Mentally add 10 or 100 to a given number 100-900, and mentally subtract 10 or 100 from a given number 100-900.*
2.7.C represent and solve addition and subtraction . . . problems where unknowns may be any one of the terms in the problem.	Represent and determine the unknown number in an addition or subtraction equation.
2.7.C represent and solve addition and subtraction word problems where unknowns may be any one of the terms in the problem.	Represent and solve addition and subtraction word problems using equations with unknowns in all positions.
2.8.A create two-dimensional shapes based on given attributes, including number of sides and vertices;	Compare, contrast, and classify attributes of two-dimensional shapes (circle, square, rectangle, triangle, hexagon) and three-dimensional shapes (cube, cone, cylinder, sphere).* Use attributes, including vertices, angles, and sides, to identify, describe, sort, and classify two-dimensional shapes.*
2.8.B classify and sort three-dimensional solids, including spheres, cones, cylinders, rectangular prisms (including cubes as special rectangular prisms), and triangular prisms, based on attributes using formal geometric language;	Compare and contrast attributes of solid figures including numbers of vertices, faces, and edges.*
2.8.C classify and sort polygons with 12 or fewer sides according to attributes, including identifying the number of sides and number of vertices;	Use attributes, including vertices, angles, and sides, to identify, describe, sort, and classify two-dimensional shapes.*
2.8.D compose two-dimensional shapes and three-dimensional solids with given properties or attributes; and	Combine and separate two-dimensional shapes to create other two-dimensional shapes and predict the results.*
2.8.E decompose two-dimensional shapes such as cutting out a square from a rectangle, dividing a shape in half, or partitioning a rectangle into identical	Combine and separate two-dimensional shapes to create other two-dimensional shapes and predict the results.*

Grade 2 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
triangles and identify the resulting geometric parts.	Solve area problems by decomposing figures into non-overlapping rectangles and adding the areas of the rectangles.*
2.9.A find the length of objects using concrete models for standard units of length;	Use a ruler to measure length in inches.* Use a ruler to measure length to 1/4 inch.* Use a ruler to measure length in centimeters.*
2.9.B describe the inverse relationship between the size of the unit and the number of units needed to equal the length of an object;	Describe how the size of a unit of measurement relates to the number of units needed to equal the length of an object. Choose the best unit to measure length: inches, feet, or yards.* Choose the best unit to measure length: centimeters or meters.* Choose inches, feet, yards, or miles to measure length.* Choose millimeters, centimeters, meters, or kilometers to measure length or distance.*
2.9.C represent whole numbers as distances from any given location on a number line;	Represent whole numbers as lengths on a number line. Represent whole number addition and subtraction within 100 on a number line.*
2.9.D determine the length of an object to the nearest marked unit using rulers, yardsticks, meter sticks, or measuring tapes;	Use a ruler to measure length in inches.* Use a ruler to measure length to 1/4 inch.* Choose millimeters, centimeters, meters, or kilometers to measure length or distance.*

**This skill is related to the aligned standard*

Grade 2 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
2.9.E determine a solution to a problem involving length, including estimating lengths;	Estimate length using inches, feet, centimeters, and meters. Solve problems involving comparing lengths of objects.* Add and subtract within 100 to solve word problems involving lengths that are given in the same units, including using equations with a symbol for the unknown number.*
2.9.F use concrete models of square units to find the area of a rectangle by covering it with no gaps or overlaps, counting to find the total number of square units, and describing the measurement using a number and the unit; and	Measure the area of a rectangle by covering it with unit squares and counting them, and show that the area is the same as would be found by multiplying the side lengths.
2.9.G read and write time to the nearest one-minute increment using analog and digital clocks and distinguish between a.m. and p.m.	Tell time to the minute and measure time intervals in minutes.
2.10.A explain that the length of a bar in a bar graph or the number of pictures in a pictograph represents the number of data points for a given category;	Create or interpret a picture graph with a single-unit scale to represent data that include multiple categories.* Construct a bar graph with a single-unit scale to represent data that includes multiple categories, and solve simple joining, separating, and comparing problems based on the data displayed.* Construct and interpret scaled bar graphs and scaled picture graphs.*
2.10.B organize a collection of data with up to four categories using . . . bar graphs with intervals of one . . .	Construct a bar graph with a single-unit scale to represent data that includes multiple categories, and solve simple joining, separating, and comparing problems based on the data displayed.

**This skill is related to the aligned standard*

Grade 2 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
2.10.B organize a collection of data with up to four categories using . . . bar graphs with intervals of one or more;	Construct and interpret scaled bar graphs and scaled picture graphs.
2.10.B organize a collection of data with up to four categories using pictographs . . .with intervals of one...	Create or interpret a picture graph with a single-unit scale to represent data that include multiple categories.
2.10.D draw conclusions and make predictions from information in a graph.	Create or interpret a picture graph with a single-unit scale to represent data that include multiple categories.* Construct a bar graph with a single-unit scale to represent data that includes multiple categories, and solve simple joining, separating, and comparing problems based on the data displayed.* Construct and interpret scaled bar graphs and scaled picture graphs.*

**This skill is related to the aligned standard*

Grade 3

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
3.2.A compose and decompose numbers up to 100,000 as a sum of so many ten thousands, so many thousands, so many hundreds, so many tens, and so many ones using objects, pictorial models, and numbers, including expanded notation as appropriate;	Read and write whole numbers through thousands in expanded form and standard form and identify the value of the digits.* Read and write whole numbers through hundred millions in expanded form and standard form and identify the value of the digits.*
3.2.B describe the mathematical relationships found in the base-10 place value system through the hundred thousands place;	Read and write whole numbers through thousands in expanded form and standard form and identify the value of the digits.* Read and write whole numbers through hundred millions in expanded form and standard form and identify the value of the digits.*
3.2.C represent a number on a number line as being between two consecutive multiples of 10; 100; 1,000; or 10,000 and use words to describe relative size of numbers in order to round whole numbers; and	Represent a whole number on a number line as a point between two consecutive multiples of 10; 100; 1,000; or 10,000, and use words to describe the relative size of the whole number in order to round it. Round whole numbers to the nearest ten and hundred.*
3.2.D compare and order whole numbers up to 100,000 and represent comparisons using the symbols >, <, or =.	Compare and order numbers through hundred millions.* Compare and order three-digit numbers.*
3.3.A represent fractions greater than zero and less than or equal to one with denominators of 2, 3, 4, 6, and 8 using concrete objects and pictorial models, including strip diagrams . . .	Identify fractions that name part of a whole (denominators of 2, 3, 4, 6, 8, 10, 12).
3.3.A represent fractions greater than zero and less than or equal to one with denominators of 2, 3, 4, 6, and 8 using	Identify fractions shown on a number line.*

Grade 3 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
concrete objects and pictorial models, including strip diagrams and number lines;	Identify fractions that name part of a set (denominators of 2, 3, 4, 6, 8, 10, 12).*
3.3.C explain that the unit fraction 1/b represents the quantity formed by one part of a whole that has been partitioned into b equal parts where b is a non-zero whole number;	Represent unit fractions (1/*b*) on number lines by defining the interval from 0 to 1 as the whole and partitioning it into *b* equal parts. Identify fractions that name part of a whole (denominators of 2, 3, 4, 6, 8, 10, 12).* Identify fractions (1/2, 1/4, 3/4) as parts of a whole using pictures.*
3.3.D . . . decompose a fraction a/b with a numerator greater than zero and less than or equal to b as a sum of parts 1/b;	Decompose a fraction into a sum of fractions with like denominators.
3.3.D compose and decompose a fraction a/b with a numerator greater than zero and less than or equal to b as a sum of parts 1/b;	Compose and decompose a fraction with a numerator greater than zero and less than or equal to the denominator as the sum of unit fractions.
3.3.E solve problems involving partitioning an object or a set of objects among two or more recipients using pictorial representations of fractions with denominators of 2, 3, 4, 6, and 8;	Solve problems involving partitioning an object or a set of objects among two or more recipients using pictorial representations of fractions. Identify fractions that name part of a set (denominators of 2, 3, 4, 6, 8, 10, 12).*
3.3.F represent equivalent fractions with denominators of 2, 3, 4, 6, and 8 using a variety of objects and pictorial models, including number lines;	Use models to find equivalent fractions. Recognize and generate equivalent fractions.* Identify fractions shown on a number line.*
3.3.G explain that two fractions are equivalent if and only if they are both represented by the same point on the	Explain why two fractions represented by visual models and number lines are equivalent.

Grade 3 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
number line or represent the same portion of a same size whole for an area model; and	Use models to find equivalent fractions.* Recognize and generate equivalent fractions.*
3.3.H compare two fractions having the same numerator or denominator in problems . . . using . . . models.	Compare two fractions with the same numerator or the same denominator using a visual fraction model.
3.3.H compare two fractions having the same numerator or denominator in problems by reasoning about their sizes and justifying the conclusion using symbols, words, objects, and pictorial models.	Compare two fractions with different numerators and different denominators using a visual fraction model.* Compare two fractions with unlike denominators.*
3.4.A solve with fluency one-step and two-step problems involving addition and subtraction within 1,000 using strategies based on place value, properties of operations, and the relationship between addition and subtraction;	Solve one- and two-step problems involving addition and subtraction within 1,000, using strategies based on place value, properties of operations, and the relationship between addition and subtraction. Add three-digit numbers with regrouping.* Subtract three-digit numbers with regrouping.*
3.4.B round to the nearest 10 or 100 or use compatible numbers to estimate solutions to addition and subtraction problems;	Round whole numbers to the nearest ten and hundred. Use rounding (to the nearest 10 or 100) or compatible numbers to estimate solutions to addition and subtraction problems.
3.4.C determine the value of a collection of coins and bills;	Solve problems involving counting dollar bills and coins, and use the dollar symbol. Solve problems with dollar bills and coins and use dollar and cent symbols.*

**This skill is related to the aligned standard*

Grade 3 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
3.4.E represent multiplication facts by using a variety of approaches such as . . . arrays . . .	Write a multiplication sentence to represent objects in a rectangular array, recognizing that the order of factors does not affect the product.
3.4.E represent multiplication facts by using a variety of approaches such as repeated addition, equal-sized groups . . .	Write multiplication sentences to represent equal groups and repeated addition.
3.4.F . . . recall . . . division facts [through 144 divided by 12];	Know division facts through 144 divided by 12.
3.4.F recall facts to multiply up to 10 by 10 with automaticity and recall the corresponding division facts;	Know multiplication/division fact families.*
3.4.F recall facts to multiply up to [12] by [12] with automaticity . . .	Know multiplication facts through 12 times 12.
3.4.G Use strategies . . . to multiply a two-digit number by a one-digit number. Strategies may include . . . the commutative, associative, and distributive properties;	Apply the properties of multiplication (zero, identity, commutative, associative, and distributive).
3.4.G use strategies and algorithms, including the standard algorithm, to multiply a two-digit number by a one-digit number. Strategies may include mental math, partial products, and the commutative, associative, and distributive properties;	Multiply two-digit numbers by one-digit numbers.*
3.4.H determine the number of objects in each group when a set of objects is partitioned into equal shares or a set of objects is shared equally;	Solve problems involving partitioning in equal groups, including identifying the remainder.
3.4.I determine if a number is even or odd using divisibility rules;	Demonstrate an understanding that a group of objects is an even number of objects if it can be divided into complete pairs and is odd if it cannot; express even numbers as doubles facts.

**This skill is related to the aligned standard*

Grade 3 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
3.4.J determine a quotient using the relationship between multiplication and division; and	Know multiplication/division fact families.*
3.4.K solve one-step and two-step problems involving . . . division within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recall of facts.	Solve one- and two-step real-world problems involving division of a two-digit number by a one-digit number.
3.4.K solve one-step and two-step problems involving multiplication and division within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recall of facts.	Write multiplication sentences to represent equal groups and repeated addition.* Write a multiplication sentence to represent objects in a rectangular array, recognizing that the order of factors does not affect the product.* Solve problems involving partitioning in equal groups, including identifying the remainder.* Solve problems involving sharing equal groups, including identifying the remainder.* Identify the remainder in a problem involving division of a two-digit number by a one-digit number.* Multiply or divide whole numbers to solve real-world problems involving multiplicative comparisons.*
3.5.A represent one- and two-step problems involving addition and subtraction of whole numbers to 1,000 using pictorial models, number lines, and equations;	Represent one- and two-step problems involving addition and subtraction of whole numbers to 1,000 using pictorial models, number lines, and equations.

**This skill is related to the aligned standard*

Grade 3 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	Add three-digit numbers with regrouping.* Subtract three-digit numbers with regrouping.* Add two-digit numbers with regrouping.* Subtract two-digit numbers with regrouping.* Subtract two-digit numbers without regrouping.*
3.5.B represent . . . multiplication . . . problems within 100 using . . . equations;	Write multiplication sentences to represent equal groups and repeated addition.
3.5.B represent . . . multiplication and . . . problems within 100 using arrays . . .	Write a multiplication sentence to represent objects in a rectangular array, recognizing that the order of factors does not affect the product.
3.5.B represent and solve one- and two-step multiplication and division problems within 100 using arrays, strip diagrams, and equations;	Solve one- and two-step problems involving multiplication and division within 100, using drawings, arrays, strip diagrams, and equations. Know multiplication facts through 12 times 12.* Multiply 10 or a multiple of 10 by a one-digit number.* Know division facts through 144 divided by 12.* Solve problems involving partitioning in equal groups, including identifying the remainder.*

**This skill is related to the aligned standard*

Grade 3 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	Solve problems involving sharing equal groups, including identifying the remainder.* Solve one- and two-step real-world problems involving division of a two-digit number by a one-digit number.* Know multiplication/division fact families.*
3.5.C describe a multiplication expression as a comparison such as 3 x 24 represents 3 times as much as 24;	Describe a multiplication expression as a comparison, such as 3 × 12 represents 3 times as much as 12.
3.5.D determine the unknown whole number in a multiplication or division equation relating three whole numbers . . .	Determine the unknown whole number in a multiplication or division equation relating three whole numbers.
3.5.D determine the unknown whole number in a multiplication or division equation relating three whole numbers when the unknown is either a missing factor or product; and	Know multiplication/division fact families.* Solve a division problem by rewriting it as an unknown factor problem. *
3.6.A classify . . . two- . . . dimensional solids . . . based on attributes using formal geometric language;	Classify two-dimensional figures based on their parallel and perpendicular lines, angle measures, or side lengths.
3.6.A classify and sort . . . three-dimensional solids, including cones, cylinders, spheres, triangular and rectangular prisms, and cubes, based on attributes using formal geometric language;	Sort and classify three-dimensional shapes according to attributes, such as vertices, faces, and edges.
3.6.A classify and sort two- . . . dimensional solids . . . based on attributes using formal geometric language;	Use attributes, including vertices, angles, and sides, to identify, describe, sort, and classify two-dimensional shapes.
3.6.A classify and sort two- and three-dimensional solids, including cones, cylinders, spheres, triangular and rectangular prisms, and cubes, based on attributes using formal geometric language;	Compare and contrast attributes of solid figures including numbers of vertices, faces, and edges.*

**This skill is related to the aligned standard*

Grade 3 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	Identify squares, rectangles, parallelograms, rhombuses, and trapezoids, and recognize them as examples of quadrilaterals. Identify quadrilaterals that do not belong to any of these subcategories.*
3.6.B use attributes to recognize rhombuses, parallelograms, trapezoids, rectangles, and squares as examples of quadrilaterals and draw examples of quadrilaterals that do not belong to any of these subcategories;	Identify squares, rectangles, parallelograms, rhombuses, and trapezoids, and recognize them as examples of quadrilaterals. Identify quadrilaterals that do not belong to any of these subcategories.
3.6.C determine the area of rectangles with whole number side lengths in problems using multiplication related to the number of rows times the number of unit squares in each row;	Describe areas of equal parts of a shape using unit fractions.* Measure the area of a rectangle by covering it with unit squares and counting them, and show that the area is the same as would be found by multiplying the side lengths.*
3.6.D decompose composite figures formed by rectangles into non-overlapping rectangles to determine the area of the original figure using the additive property of area; and	Solve area problems by decomposing figures into non-overlapping rectangles and adding the areas of the rectangles. Combine and separate two-dimensional shapes to create other two-dimensional shapes and predict the results.* Find the total number of square units in a rectangle divided into same-size squares.*
3.6.E decompose . . . two-dimensional figures into [2, 3, 4, 6, or 8] parts with equal areas . . . and recognize that equal [parts] . . . of identical wholes need not have the same shape.	Partition shapes into 2, 3, 4, 6 or 8 parts with equal area.
3.7.A determine the perimeter of a polygon . . .	Use side lengths to solve problems involving perimeter.

**This skill is related to the aligned standard*

Grade 3 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
3.7.A represent fractions of halves, fourths, and eighths as distances from zero on a number line;	Represent fractions of halves, thirds, fourths, sixths, and eighths as distances from zero on a number line. Identify fractions shown on a number line.*
3.7.C determine the solutions to problems involving addition and subtraction of time intervals in minutes using pictorial models or tools such as a 15-minute event plus a 30-minute event equals 45 minutes;	Solve word problems involving addition and subtraction of time intervals in minutes involving elapsed time less than 60 minutes.
3.7.D determine when it is appropriate to use measurements of liquid volume (capacity) or weight; and	Choose ounces, pounds, or tons to measure weight.* Choose grams or kilograms to measure mass.* Choose milliliters or liters to measure liquid volume.* Choose fluid ounces, cups, quarts, or gallons to measure capacity.*
3.7.E determine . . . weight using appropriate units and tools.	Use a balance scale to measure and compare weights in ounces and pounds.
3.7.E determine liquid volume (capacity) . . . using appropriate units and tools.	Measure capacity in ounces, cups, quarts, and gallons and liquid volume in milliliters and liters, using appropriate tools, such as measuring cups and beakers with a measurement scale.
3.8.A summarize a data set with multiple categories using a . . . pictograph . . . with scaled intervals . . .	Create or interpret a picture graph with a single-unit scale to represent data that include multiple categories.
3.8.A summarize a data set with multiple categories using a . . . pictograph, or bar graph with scaled intervals . . .	Construct and interpret scaled bar graphs and scaled picture graphs.

**This skill is related to the aligned standard*

Grade 3 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
3.8.A summarize a data set with multiple categories using a frequency table, dot plot, pictograph, or bar graph with scaled intervals; and	Construct a bar graph with a single-unit scale to represent data that includes multiple categories, and solve simple joining, separating, and comparing problems based on the data displayed.*
3.8.B solve one- and two-step problems using categorical data represented with a . . . pictograph, or bar graph with scaled intervals.	Solve one- and two-step problems using categorical data in picture graphs and bar graphs with scaled intervals.
3.8.B solve one- and two-step problems using categorical data represented with a frequency table, dot plot, pictograph, or bar graph with scaled intervals.	Construct and interpret scaled bar graphs and scaled picture graphs.* Create or interpret a picture graph with a single-unit scale to represent data that include multiple categories.* Construct a bar graph with a single-unit scale to represent data that includes multiple categories, and solve simple joining, separating, and comparing problems based on the data displayed.*
3.8.B solve one- and two-step problems using categorical data represented with a frequency table, [and] dot plot . . .	Solve one- and two-step problems using categorical data in a frequency table and line plot.

Grade 4

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
4.2.A interpret the value of each place-value position as 10 times the position to the right . . .	Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right.
4.2.A interpret the value of each place-value position as 10 times the position to the right and as one-tenth of the value of the place to its left;	Demonstrate an understanding of place value in base-ten by showing how the places increase by powers of 10 from right to left. Read and write whole numbers through hundred millions in expanded form and standard form and identify the value of the digits.* Read and write whole numbers through thousands in expanded form and standard form and identify the value of the digits.*
4.2.B represent the value of the digit in whole numbers through 1,000,000,000 and decimals to the hundredths using expanded notation and numerals;	Read and write whole numbers through hundred millions in expanded form and standard form and identify the value of the digits. Read and write whole numbers through thousands in expanded form and standard form and identify the value of the digits.*
4.2.C compare and order whole numbers to 1,000,000,000 and represent comparisons using the symbols >, <, or =;	Compare and order numbers through hundred millions. Compare and order numbers through hundred thousands.*
4.2.D round whole numbers to a given place value through the hundred thousands place;	Round whole numbers to the nearest ten, hundred, thousand, ten thousand, and hundred thousand.
4.2.E represent decimals, including tenths and hundredths, using concrete and visual models and money;	Compare and order decimals through hundredths.*

**This skill is related to the aligned standard*

Grade 4 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
4.2.F compare and order decimals using concrete and visual models to the hundredths;	Compare and order decimals through hundredths.
4.2.G relate decimals to fractions that name tenths and hundredths; and	Express fractions with denominators of 10 or 100 as decimals.*
4.2.H determine the corresponding decimal to the tenths or hundredths place of a specified point on a number line.	Express fractions with denominators of 10 or 100 as decimals. Locate decimals through hundredths on a number line.
4.3.A represent a fraction a/b as a sum of fractions 1/b, where a and b are whole numbers and b > 0, including when a > b;	Understand a fraction *a*/*b* as a sum of unit fractions 1/*b*. Decompose a fraction into a sum of fractions with like denominators.*
4.3.B decompose a fraction in more than one way into a sum of fractions with the same denominator using concrete and pictorial models and recording results with symbolic representations;	Decompose a fraction into a sum of fractions with like denominators.
4.3.C determine if two given fractions are equivalent using a variety of methods;	Recognize and generate equivalent fractions. Use models to find equivalent fractions.* Express a fraction with denominator 10 as an equivalent fraction with denominator 100 and add two fractions with respective denominators 10 and 100.*
4.3.D compare two fractions with different numerators and different denominators and represent the comparison using the symbols >, =, or <;	Compare two fractions with unlike denominators. Compare two fractions with different numerators and different denominators using a visual fraction model.*

Grade 4 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
4.3.E represent and solve addition and subtraction of fractions with equal denominators . . .	Solve word problems by adding and subtracting fractions with like denominators that refer to the same whole.
4.3.E represent and solve addition and subtraction of fractions with equal denominators using objects and pictorial models that build to the number line and properties of operations;	Add and subtract fractions with like denominators.
4.3.F evaluate the reasonableness of sums and differences of fractions using benchmark fractions 0, 1/4, 1/2, 3/4, and 1, referring to the same whole; and	Add and subtract fractions with like denominators.*
4.4.A . . . subtract whole numbers . . . using the standard algorithm;	Subtract multi-digit numbers.
4.4.A add . . . whole numbers . . . using the standard algorithm;	Add multi-digit numbers.
4.4.A add and subtract . . . decimals to the hundredths place using the standard algorithm;	Add and subtract decimals through hundredths.
4.4.A add and subtract whole numbers and decimals to the hundredths place using the standard algorithm;	Add three-digit numbers with regrouping.* Subtract three-digit numbers with regrouping.*
4.4.B determine products of a number and 10 or 100 using properties of operations and place value understandings;	Multiply a whole number by a power of 10 or a multiple of 10.* Multiply 10 or a multiple of 10 by a one-digit number.*
4.4.C represent the product of 2 two-digit numbers using . . . equations . . .	Write multiplication sentences to represent equal groups and repeated addition.
4.4.C represent the product of 2 two-digit numbers using arrays . . . or equations . . .	Write a multiplication sentence to represent objects in a rectangular array, recognizing that the order of factors does not affect the product.

**This skill is related to the aligned standard*

Grade 4 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
4.4.C represent the product of 2 two-digit numbers using arrays, area models, or equations, including perfect squares through 15 by 15;	Use arrays, area models, and equations to represent the product of two two-digit numbers.
4.4.D use strategies and algorithms, including the standard algorithm, to multiply up to a four-digit number by a one-digit number . . . Strategies may include mental math, partial products, and the commutative, associative, and distributive properties;	Multiply a whole number of up to four digits by a one-digit whole number using strategies based on place value and the properties of operations.
4.4.D use strategies and algorithms, including the standard algorithm, to multiply up to a four-digit number by a one-digit number and to multiply a two-digit number by a two-digit number. Strategies may include mental math, partial products, and the commutative, associative, and distributive properties;	Multiply two-digit numbers by one-digit numbers.* Multiply three-digit numbers by one-digit numbers.* Multiply multi-digit numbers by two-digit numbers.* Multiply two-digit whole numbers by two-digit whole numbers.*
4.4.E represent the quotient of up to a four-digit whole number divided by a one-digit whole number using arrays, area models, or equations;	Represent the quotient of up to a four-digit whole number divided by a one-digit whole number using arrays, area models, or equations. Solve problems involving sharing equal groups, including identifying the remainder.* Solve one- and two-step real-world problems involving division of a two-digit number by a one-digit number.*
4.4.F . . . divide up to a four-digit dividend by a one-digit divisor;	Divide up to four-digit whole numbers by one-digit whole numbers.

**This skill is related to the aligned standard*

Grade 4 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
4.4.F use strategies and algorithms, including the standard algorithm, to divide up to a four-digit dividend by a one-digit divisor;	Identify the remainder in a problem involving division of a two-digit number by a one-digit number.* Divide four-digit numbers by two-digit numbers using models.*
4.4.G round to the nearest 10, 100, or 1,000 or use compatible numbers to estimate solutions involving whole numbers; and	Estimate and assess the reasonableness of answers to word problems involving whole numbers and the four operations. Round whole numbers to the nearest ten, hundred, thousand, ten thousand, and hundred thousand.*
4.4.H solve with fluency one- and two-step problems involving multiplication and division, including interpreting remainders.	Multiply a whole number by a power of 10 or a multiple of 10.* Multiply two-digit numbers by one-digit numbers.* Multiply three-digit numbers by one-digit numbers.* Divide up to four-digit whole numbers by one-digit whole numbers.* Multiply multi-digit numbers by two-digit numbers.* Divide four-digit numbers by two-digit numbers using models.* Identify the remainder in a problem involving division of a two-digit number by a one-digit number.*

Grade 4 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	Multiply or divide whole numbers to solve real-world problems involving multiplicative comparisons.* Interpret the remainder in a real-world problem involving division of up to a three-digit number by a one-digit number.*
4.5.A represent multi-step problems involving the four operations with whole numbers using strip diagrams and equations with a letter standing for the unknown quantity;	Write and solve equations with variables to determine the answers to multi-step real-world problems using the four operations and whole numbers. Determine the operation(s) needed to solve one- and two-step word problems involving all four operations with whole numbers and represent these problems using equations with a letter standing for the unknown quantity.* Write and solve two-step real-world problems using addition, subtraction, multiplication, and division.* Solve one- and two-step real-world problems involving addition, subtraction, and multiplication of decimals.*
4.5.B represent problems using an input-output table and numerical expressions to generate a number pattern that follows a given rule representing the relationship of the values in the resulting sequence and their position in the sequence;	Describe, extend, analyze, and make generalizations about numeric patterns.* Generate a number or shape pattern that follows a given rule, and identify and explain features of the pattern that were not explicit in the rule.*
4.5.C use models to determine the formulas for . . . the area of a rectangle (l x w); and	Use formulas to find the area of rectangles and squares.

Grade 4 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
4.5.C use models to determine the formulas for the perimeter of a rectangle (l + w + l + w or 2l + 2w), including the special form for perimeter of a square (4s) and the area of a rectangle (l x w); and	Use side lengths to solve problems involving perimeter.*
4.5.D solve problems related to . . . area of rectangles where dimensions are whole numbers.	Use formulas to find the area of rectangles and squares.
4.5.D solve problems related to perimeter and area of rectangles where dimensions are whole numbers.	Use side lengths to solve problems involving perimeter.* Measure the area of a rectangle by covering it with unit squares and counting them, and show that the area is the same as would be found by multiplying the side lengths.* Solve area problems by decomposing figures into non-overlapping rectangles and adding the areas of the rectangles.*
4.6.A identify . . . angles, and perpendicular and parallel lines;	Identify acute, obtuse, right, and straight angles and perpendicular and parallel lines.
4.6.A identify points, lines, line segments, rays . . .	Identify points, lines, line segments, rays, and planes in two-dimensional figures.
4.6.B identify and draw one or more lines of symmetry, if they exist, for a two-dimensional figure;	Identify one or more lines of symmetry in two-dimensional figures.
4.6.C apply knowledge of right angles to identify acute, right, and obtuse triangles; and	Sort and classify triangles according to their side lengths and angle measures.*
4.6.D classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines or the presence or absence of angles of a specified size.	Classify two-dimensional figures based on their parallel and perpendicular lines, angle measures, or side lengths.
4.7.A illustrate the measure of an angle as the part of a circle whose center is at	Understand that an angle is measured with reference to a circle with its center at the

Grade 4 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
the vertex of the angle that is "cut out" by the rays of the angle. Angle measures are limited to whole numbers;	vertex of the angle, by considering the portion of the circle that the angle turns through. An angle that turns through 1/360 of the circle has a measure of 1 degree, and an angle that turns through n/360 of a circle has a measure of n degrees.
4.7.B illustrate degrees as the units used to measure an angle, where 1/360 of any circle is one degree and an angle that "cuts" n/360 out of any circle whose center is at the angle's vertex has a measure of n degrees. Angle measures are limited to whole numbers;	Understand that an angle is measured with reference to a circle with its center at the vertex of the angle, by considering the portion of the circle that the angle turns through. An angle that turns through 1/360 of the circle has a measure of 1 degree, and an angle that turns through n/360 of a circle has a measure of n degrees.
4.7.C determine the approximate measures of angles in degrees to the nearest whole number using a protractor;	Measure angles using a virtual protractor.
4.7.D draw an angle with a given measure; and	Measure angles using a virtual protractor.*
4.8.A identify relative sizes of measurement units within the customary and metric systems;	Know relative sizes of measurement units within the customary or metric systems, including km, m, cm; kg, g; lb., oz.; l, ml; hr, min, sec. Choose inches, feet, yards, or miles to measure length.* Choose millimeters, centimeters, meters, or kilometers to measure length or distance.* Choose ounces, pounds, or tons to measure weight.* Choose grams or kilograms to measure mass.*

Grade 4 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	Choose milliliters or liters to measure liquid volume.* Choose fluid ounces, cups, quarts, or gallons to measure capacity.* Choose millimeters, centimeters, meters, or kilometers to measure length.*
4.8.B convert measurements within the same measurement system, customary or metric, from . . . a larger unit into a smaller unit when given other equivalent measures represented in a table; and	Within the same system of measurement, convert measurements in a larger unit to a smaller unit, including km, m, cm; kg, g; lb., oz.; l, ml; hr, min, sec, and record measurement equivalents in a table.
4.8.B convert measurements within the same measurement system, customary or metric, from a smaller unit into a larger unit or a larger unit into a smaller unit when given other equivalent measures represented in a table; and	Convert and compare customary units of length (inches, feet, yards, miles).* Convert and compare metric units of length (millimeters, centimeters, meters, kilometers).* Convert customary units of weight and metric units of mass.* Convert customary and metric units of capacity.* Convert and compare customary units of weight and metric units of mass involving whole-number measures.* Convert and compare customary and metric units of capacity involving whole-number measures.*
4.8.C solve problems that deal with measurements of . . . intervals of time . . . using addition, subtraction, multiplication, or division as appropriate.	Solve real-world problems involving elapsed time.

Grade 4 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
4.8.C solve problems that deal with measurements of . . . liquid volumes . . . using addition, subtraction, multiplication, or division as appropriate.	Use the four operations and drawings to solve one-step word problems involving masses or volumes expressed in like units.
4.8.C solve problems that deal with measurements of length, intervals of time, liquid volumes, mass, and money using addition, subtraction, multiplication, or division as appropriate.	Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Solve multi-step, real-world problems involving conversion among measurement units within a system.*
4.9.A represent data on a frequency table, dot plot, or stem-and-leaf plot marked with whole numbers and fractions; and	Construct line plots using data in fractional units of 1/2, 1/4, and 1/8, and solve problems involving addition and subtraction of fractions by using the information in the line plots.*
4.9.B solve one- and two-step problems using data in whole number, decimal, and fraction form in a frequency table, dot plot, or stem-and-leaf plot.	Construct line plots using data in fractional units of 1/2, 1/4, and 1/8, and solve problems involving addition and subtraction of fractions by using the information in the line plots.*

Grade 5

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
5.2.A represent the value of the digit in decimals through the thousandths using expanded notation and numerals;	Read and write decimals to thousandths in standard form, word form, and expanded form.
5.2.B compare . . . two decimals to thousandths . . .	Compare two decimals through thousandths.
5.2.B compare and order two decimals to thousandths and represent comparisons using the symbols >, <, or =; and	Compare and order decimals through hundredths.* Compare two decimals to hundredths, including amounts of money.*
5.2.C round decimals to tenths or hundredths.	Round decimals to any place.*
5.3.A estimate to determine solutions to mathematical and real-world problems involving addition, subtraction, multiplication, or division;	Add multi-digit numbers.* Subtract multi-digit numbers.* Multiply a whole number by a power of 10 or a multiple of 10.* Multiply two-digit numbers by one-digit numbers.* Multiply three-digit numbers by one-digit numbers.* Divide up to four-digit whole numbers by one-digit whole numbers.* Add and subtract decimals through hundredths.* Multiply multi-digit numbers by two-digit numbers.* Divide four-digit numbers by two-digit numbers using models.*

**This skill is related to the aligned standard*

Grade 5 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	Add and subtract fractions and mixed numbers with unlike denominators.* Multiply a whole number by a fraction.* Multiply fractions. * Multiply a decimal number by a whole number.* Multiply decimal numbers through hundredths.* Divide decimals to hundredths.* Multiply and divide multi-digit decimals by positive powers of 10 and demonstrate an understanding of the patterns involved in multiplying and dividing by powers of 10 by identifying and explaining the patterns.* Multiply multi-digit decimals.* Divide multi-digit whole numbers.* Divide multi-digit decimals.* Divide fractions.*
5.3.B multiply with fluency a three-digit number by a two-digit number using the standard algorithm;	Multiply three-digit numbers by one-digit numbers.* Multiply multi-digit numbers by two-digit numbers.* Multiply two-digit whole numbers by two-digit whole numbers.*

**This skill is related to the aligned standard*

Grade 5 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
5.3.C solve with proficiency for quotients of up to a four-digit dividend by a two-digit divisor using strategies and the standard algorithm;	Divide four-digit numbers by two-digit numbers using models.* Divide up to four-digit whole numbers by one-digit whole numbers.* Divide multi-digit whole numbers.*
5.3.E solve for products of decimals to the hundredths, including situations involving money, using strategies based on place-value understandings, properties of operations, and the relationship to the multiplication of whole numbers;	Multiply decimal numbers through hundredths.*
5.3.G solve for quotients of decimals to the hundredths, up to four-digit dividends and two-digit whole number divisors, using strategies and algorithms, including the standard algorithm;	Divide decimals to hundredths.*
5.3.H represent and solve addition and subtraction of fractions with unequal denominators referring to the same whole using objects and pictorial models and properties of operations;	Add and subtract fractions and mixed numbers with unlike denominators.* Solve word problems involving the addition and subtraction of fractions with like and unlike denominators using fraction models or equations, and use benchmark fractions to assess the reasonableness of the solution.*
5.3.I represent and solve multiplication of a whole number and a fraction that refers to the same whole using objects and pictorial models, including area models;	Solve word problems involving multiplication of a fraction by a whole number by using visual fraction models and equations to represent the problem. Multiply a whole number by a fraction.*
5.3.J represent division of a unit fraction by a whole number and the division of a whole number by a unit fraction such as 1/3	Divide fractions.*

Grade 5 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
÷ 7 and 7 ÷ 1/3 using objects and pictorial models, including area models;	Divide a unit fraction by a whole number or a whole number by a unit fraction.*
5.3.K add and subtract positive rational numbers fluently; and	Add and subtract fractions and mixed numbers with unlike denominators.* Add and subtract decimals through hundredths.* Add multi-digit numbers.* Subtract multi-digit numbers.* Add and subtract fractions with like denominators.*
5.3.L divide whole numbers by unit fractions and unit fractions by whole numbers.	Divide a unit fraction by a whole number or a whole number by a unit fraction. Solve real-world problems by dividing unit fractions by non-zero whole numbers and by dividing whole numbers by unit fractions. Divide fractions.*
5.4.A identify prime and composite numbers;	Determine whether a whole number from 1 to 100 is prime or composite.
5.4.B represent and solve multi-step problems involving the four operations with whole numbers using equations with a letter standing for the unknown quantity;	Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$, where p, q, and x are all nonnegative rational numbers.
5.4.C generate a numerical pattern when given a rule in the form y = ax or y = x + a and graph;	Generate and analyze an additive or multiplicative numerical pattern from its equation, table, or graph. Describe, extend, analyze, and make generalizations about numeric patterns.*

**This skill is related to the aligned standard*

Grade 5 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	Generate two numerical patterns using two given rules, identify relationships between corresponding terms, and form and graph ordered pairs using corresponding terms.*
5.4.D recognize the difference between additive and multiplicative numerical patterns given in a table or graph;	Generate and analyze an additive or multiplicative numerical pattern from its equation, table, or graph. Describe, extend, analyze, and make generalizations about numeric patterns.* Write and evaluate expressions with grouping symbols.*
5.4.F simplify numerical expressions that do not involve exponents, including up to two levels of grouping;	Write and evaluate expressions with grouping symbols.*
5.4.G use concrete objects and pictorial models to develop the formulas for the volume of a rectangular prism, including the special form for a cube (V = l x w x h, V = s x s x s, and V = Bh); and	Use formulas to find the volume of cubes and rectangular prisms.* Use unit cubes to find the volume of right rectangular prisms with fractional edge lengths.* Use a formula to find the volume of right rectangular prisms with fractional edge lengths.*
5.4.H represent and solve problems related to perimeter and/or area and related to volume.	Use formulas to find the volume of cubes and rectangular prisms.* Use formulas to find the area of rectangles and squares.* Use unit cubes to find the volume of right rectangular prisms with fractional edge lengths.*

**This skill is related to the aligned standard*

Grade 5 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	Use a formula to find the volume of right rectangular prisms with fractional edge lengths.* Find the volume of composite figures to solve mathematical and real-world problems.* Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas.*
5.6.A recognize a cube with side length of one unit as a unit cube having one cubic unit of volume and the volume of a three-dimensional figure as the number of unit cubes (n cubic units) needed to fill it with no gaps or overlaps if possible; and	Use unit cubes to find the volume of right rectangular prisms with fractional edge lengths. Recognize a unit cube as a cube with side length one unit and volume one cubic unit, and recognize that a three-dimensional figure that can be fully packed with *n* unit cubes has a volume of *n* cubic units. Use unit cubes to find the volume of right rectangular prisms.*
5.6.B determine the volume of a rectangular prism with whole number side lengths in problems related to the number of layers times the number of unit cubes in the area of the base.	Use unit cubes to find the volume of right rectangular prisms with fractional edge lengths.* Use unit cubes to find the volume of right rectangular prisms.* Find the volume of composite figures to solve mathematical and real-world problems.*
5.8.A describe the key attributes of the coordinate plane, including perpendicular number lines (axes) where the intersection (origin) of the two lines coincides with zero	Identify the origin and axes in the coordinate system, locate and plot ordered pairs on a coordinate grid, and find the

Grade 5 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
on each number line and the given point (0, 0); the x-coordinate, the first number in an ordered pair, indicates movement parallel to the x-axis starting at the origin; and the y-coordinate, the second number, indicates movement parallel to the y-axis starting at the origin;	distance between two points with the same *x*- or *y*-coordinate.*
5.8.B describe the process for graphing ordered pairs of numbers in the first quadrant of the coordinate plane; and	Identify the origin and axes in the coordinate system, locate and plot ordered pairs on a coordinate grid, and find the distance between two points with the same *x*- or *y*-coordinate.* Locate pairs of rational numbers and plot points with rational number coordinates in all four quadrants on a coordinate plane. * Locate and plot points in all four quadrants of the coordinate plane and use the points to find horizontal and vertical distances.*
5.8.C graph in the first quadrant of the coordinate plane ordered pairs of numbers arising from mathematical and real-world problems, including those generated by number patterns or found in an input-output table.	Use the first quadrant of the coordinate plane to represent and solve real-world and mathematical problems. Locate pairs of rational numbers and plot points with rational number coordinates in all four quadrants on a coordinate plane. * Locate and plot points in all four quadrants of the coordinate plane and use the points to find horizontal and vertical distances.* Generate two numerical patterns using two given rules, identify relationships between corresponding terms, and form and graph ordered pairs using corresponding terms.*

Grade 5 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
5.9.A represent categorical data with bar graphs or frequency tables and numerical data, including data sets of measurements in fractions or decimals, with dot plots or stem-and-leaf plots;	Display numerical data in dot plots, draw inferences from the data, and describe patterns in the data.*
5.9.C solve one- and two-step problems using data from a frequency table, dot plot, bar graph, stem-and-leaf plot, or scatterplot.	Display numerical data in dot plots, draw inferences from the data, and describe patterns in the data.*

Grade 6

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
6.2.B identify a number, its opposite, and its absolute value;	Understand absolute value and interpret it in the context of a real-world situation.* Understand that opposite signs indicate locations on opposite sides of the number line and that the opposite of the opposite of a number is the number itself.*
6.2.C locate, compare . . . rational numbers using a number line;	Represent and compare positive and negative rational numbers as points on the number line.
6.2.D order a set of rational numbers arising from . . . real-world contexts; and	Order rational numbers in real-world contexts.
6.2.E extend representations for division to include fraction notation such as a/b represents the same number as a ÷ b where b # 0.	Interpret a fraction as the division of the numerator by the denominator in a mathematical or real-world context.
6.3.C represent integer operations with concrete models and connect the actions with the models to standardized algorithms;	Add positive and negative rational numbers.* Subtract positive and negative rational numbers.* Multiply positive and negative rational numbers and interpret products in real-world contexts.* Divide positive and negative rational numbers and interpret quotients in real-world contexts.*
6.3.D add, subtract, multiply, and divide integers fluently; and	Add positive and negative rational numbers.* Subtract positive and negative rational numbers.*

Grade 6 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	Multiply positive and negative rational numbers and interpret products in real-world contexts.* Divide positive and negative rational numbers and interpret quotients in real-world contexts.*
6.3.E multiply and divide positive rational numbers fluently.	Multiply positive and negative rational numbers and interpret products in real-world contexts.* Divide positive and negative rational numbers and interpret quotients in real-world contexts.* Multiply multi-digit decimals.* Divide multi-digit whole numbers.* Divide multi-digit decimals.* Divide fractions.* Multiply a decimal number by a whole number.* Multiply decimal numbers through hundredths.* Divide decimals to hundredths.* Multiply and divide multi-digit decimals by positive powers of 10 and demonstrate an understanding of the patterns involved in multiplying and dividing by powers of 10 by identifying and explaining the patterns.*

**This skill is related to the aligned standard*

Grade 6 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	Multiply a whole number by a fraction.* Multiply multi-digit numbers by two-digit numbers.* Divide four-digit numbers by two-digit numbers using models.* Divide a unit fraction by a whole number or a whole number by a unit fraction.*
6.4.A compare two rules verbally, numerically, graphically, and symbolically in the form of y = ax or y = x + a in order to differentiate between additive and multiplicative relationships;	Describe, extend, analyze, and make generalizations about numeric patterns.*
6.4.B apply qualitative and quantitative reasoning to solve prediction and comparison of real-world problems involving ratios and rates;	Solve problems using ratio and rate reasoning. Solve problems involving unit rate.*
6.4.C give examples of ratios as multiplicative comparisons of two quantities describing the same attribute;	Write a ratio to describe the relationship between two quantities using the forms *a:b* and *a/b*. Solve problems using ratio and rate reasoning.*
6.4.D give examples of rates as the comparison by division of two quantities having different attributes, including rates as quotients;	Solve problems involving unit rate.* Solve problems using ratio and rate reasoning.*
6.4.E represent ratios and percents with concrete models, fractions, and decimals;	Find equivalent ratios and complete equivalent ratio tables.* Express fractions as percents and percents as fractions.*

Grade 6 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	Express decimals as percents and percents as decimals.*
6.4.F represent benchmark fractions and percents such as 1%, 10%, 25%, 33 1/3%, and multiples of these values using 10 by 10 grids, strip diagrams, number lines, and numbers;	Express fractions as percents and percents as fractions.*
6.4.G generate equivalent forms of fractions . . . and percents using real-world problems, including problems that involve money; and	Express decimals as percents and percents as decimals.
6.4.G generate equivalent forms of fractions, decimals, and percents using real-world problems, including problems that involve money; and	Express fractions as percents and percents as fractions.*
6.4.H convert units within a measurement system, including the use of proportions and unit rates.	Convert and compare customary units of weight and metric units of mass involving whole-number measures.* Convert and compare customary and metric units of capacity involving whole-number measures.* Use ratio reasoning to convert measurement units.*
6.5.A represent mathematical and real-world problems involving . . . proportions;	Use proportions to solve real-world and mathematical problems.
6.5.A represent mathematical and real-world problems involving ratios and rates using scale factors . . .	Use scale drawings to solve problems, including finding actual lengths and areas and creating different scales.
6.5.A represent mathematical and real-world problems involving ratios and rates using scale factors, tables, graphs, and proportions;	Solve problems involving unit rate.* Solve problems using ratio and rate reasoning.*

**This skill is related to the aligned standard*

Grade 6 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
6.5.B solve real-world problems to find the . . . percent given the part and the whole, including the use of concrete and pictorial models; and	Solve problems involving percent of a number.
6.5.B solve real-world problems to find the whole given a part and the percent . . .	Solve problems involving finding the whole, given a part and the percent.
6.5.C use equivalent fractions, decimals, and percents to show equal parts of the same whole.	Find equivalent ratios and complete equivalent ratio tables.* Express fractions as percents and percents as fractions.* Express decimals as percents and percents as decimals.*
6.6.A identify independent and dependent quantities from tables and graphs;	Show the relationship between an independent and dependent variable with graphs, tables, and equations. Write an equation in two variables for a real-world problem in which a dependent and independent variable change in relationship to one another.*
6.6.B write an equation that represents the relationship between independent and dependent quantities from a table; and	Write an equation in two variables for a real-world problem in which a dependent and independent variable change in relationship to one another.
6.6.C represent a given situation using verbal descriptions, tables, graphs, and equations in the form y = kx or y = x + b.	Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$, where p, q, and x are all nonnegative rational numbers.* Write an equation in two variables for a real-world problem in which a dependent and independent variable change in relationship to one another.*

**This skill is related to the aligned standard*

Grade 6 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
6.7.A generate equivalent numerical expressions using order of operations, including whole number exponents and prime factorization;	Simplify numerical expressions, including those involving whole number exponents or prime factorizations, using the order of operations. Write and evaluate numerical expressions with whole-number exponents.*
6.7.B distinguish between expressions and equations verbally, numerically, and algebraically;	Read, write, and identify variable expressions or parts of expressions, using mathematical terms (sum, term, product, factor, quotient, coefficient).* Use properties of operations to write and identify equivalent expressions.*
6.7.C determine if two expressions are equivalent using concrete models, pictorial models, and algebraic representations; and	Use properties of operations to write and identify equivalent expressions.*
6.7.D generate equivalent expressions using the properties of operations: inverse, identity, commutative, associative, and distributive properties.	Use properties of operations to write and identify equivalent expressions. Write equivalent expressions in different forms to show relationships.*
6.8.A extend previous knowledge of triangles and their properties to include . . . determining when three lengths form a triangle;	Given the measures of three sides or three angles, determine what type of triangle, if any, can be formed.
6.8.B model area formulas for parallelograms, trapezoids, and triangles by decomposing and rearranging parts of these shapes;	Use formulas to solve problems involving finding the area of two-dimensional figures composed of triangles, quadrilaterals, and polygons.
6.8.C write equations that represent problems related to the area of rectangles, parallelograms, trapezoids, and triangles and volume of right rectangular prisms where dimensions are positive rational numbers; and	Use a formula to find the volume of right rectangular prisms with fractional edge lengths.*

Grade 6 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	Use formulas to find the volume of three-dimensional objects composed of cubes and right prisms.*
6.8.D determine solutions for problems involving the area of rectangles, parallelograms, trapezoids, and triangles and volume of right rectangular prisms where dimensions are positive rational numbers.	Use a formula to find the volume of right rectangular prisms with fractional edge lengths.* Use formulas to find the volume of three-dimensional objects composed of cubes and right prisms.*
6.9.A write one-variable, one-step . . . inequalities to represent constraints or conditions within problems;	Write an inequality of the form $x > c$ or $x < c$ to represent a real-world or mathematical problem.
6.9.A write one-variable, one-step equations . . . to represent constraints or conditions within problems;	Write a one-variable, one-step equation to represent a real-world or mathematical problem, or represent a one-variable, one-step equation with a corresponding real-world problem.
6.9.A write one-variable, one-step equations and inequalities to represent constraints or conditions within problems;	Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$, where p, q, and x are all nonnegative rational numbers.*
6.9.B represent solutions for one-variable, one-step equations . . . on number lines; and	Use models of one-step equations to represent real-world problems, including geometric concepts.
6.9.B represent solutions for one-variable, one-step equations and inequalities on number lines; and	Solve and graph the solutions of inequalities of the form $px + q > r$ or $px + q < r$, where p, q, and r are rational numbers.* Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$, where p, q, and x are all nonnegative rational numbers.*

Grade 6 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	Use inequality statements to describe the relative position of two numbers on a number line.*
6.9.C write corresponding real-world problems given one-variable, one-step equations . . .	Write a one-variable, one-step equation to represent a real-world or mathematical problem, or represent a one-variable, one-step equation with a corresponding real-world problem.
6.10.A model . . . one-variable, one-step . . . inequalities that represent problems, including geometric concepts; and	Write an inequality of the form $x > c$ or $x < c$ to represent a real-world or mathematical problem.
6.10.A model . . . one-variable, one-step equations . . . that represent problems, including geometric concepts; and	Use models of one-step equations to represent real-world problems, including geometric concepts.
6.10.A model and solve one-variable, one-step . . . inequalities that represent problems, including geometric concepts; and	Solve and graph the solutions of inequalities of the form $px + q > r$ or $px + q < r$, where p, q, and r are rational numbers.
6.10.A model and solve one-variable, one-step equations . . . that represent problems, including geometric concepts; and	Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$, where p, q, and x are all nonnegative rational numbers.
6.10.B determine if the given value(s) make(s) one-variable, one-step . . . inequalities true.	Use substitution to determine whether a solution to an inequality is true.
6.10.B determine if the given value(s) make(s) one-variable, one-step equations . . . true.	Use substitution to determine whether a solution to an equation is true.
6.11 The student applies mathematical process standards to use coordinate geometry to identify locations on a plane. The student is expected to graph points in all four quadrants using ordered pairs of rational numbers.	Locate pairs of rational numbers and plot points with rational number coordinates in all four quadrants on a coordinate plane.

**This skill is related to the aligned standard*

Grade 6 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
6.12.A represent numeric data graphically, including . . . box plots;	Display numerical data in box plots, draw inferences from the data, and describe patterns in the data.
6.12.A represent numeric data graphically, including . . . histograms . . .	Display numerical data in histograms, draw inferences from the data, and describe patterns in the data.
6.12.A represent numeric data graphically, including dot plots . . .	Display numerical data in dot plots, draw inferences from the data, and describe patterns in the data.
6.12.B use the graphical representation of numeric data to describe the center, spread, and shape of the data distribution;	Display numerical data in histograms, draw inferences from the data, and describe patterns in the data. Display numerical data in box plots, draw inferences from the data, and describe patterns in the data. Find, use, and interpret mean, median, mode, range, and maximum and minimum.* Use mean, median, mode, range, and maximum and minimum to describe and compare data sets.* Find, use, and interpret mean, median, mode, range, and maximum and minimum using data in box plots.*
6.12.C summarize numeric data with numerical summaries, including . . . interquartile range (IQR) (measures of spread), and use these summaries to describe the . . . spread . . . of the data distribution; and	Use interquartile range to describe variability of data and explain deviations from overall pattern in context.
6.12.C summarize numeric data with numerical summaries, including the mean and median (measures of center)	Compare inferences made from numerical data for two populations using measures of center and variability.

**This skill is related to the aligned standard*

Grade 6 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
and the range and interquartile range (IQR) (measures of spread), and use these summaries to describe the center, spread, and shape of the data distribution; and	Find, use, and interpret mean, median, mode, range, and maximum and minimum.* Use mean, median, mode, range, and maximum and minimum to describe and compare data sets.* Display numerical data in histograms, draw inferences from the data, and describe patterns in the data.* Display numerical data in box plots, draw inferences from the data, and describe patterns in the data.*
6.12.D summarize categorical data with numerical and graphical summaries, including the mode, the percent of values in each category (relative frequency table), and the percent bar graph, and use these summaries to describe the data distribution.	Find, use, and interpret mean, median, mode, range, and maximum and minimum.* Use mean, median, mode, range, and maximum and minimum to describe and compare data sets.* Display numerical data in histograms, draw inferences from the data, and describe patterns in the data.* Display numerical data in box plots, draw inferences from the data, and describe patterns in the data.*
6.13.A interpret numeric data summarized in . . . box plots; and	Display numerical data in box plots, draw inferences from the data, and describe patterns in the data.
6.13.A interpret numeric data summarized in . . . histograms . . .	Display numerical data in histograms, draw inferences from the data, and describe patterns in the data.

Grade 6 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
6.13.A interpret numeric data summarized in dot plots, stem-and-leaf plots, histograms, and box plots; and	Display numerical data in dot plots, draw inferences from the data, and describe patterns in the data.*

Grade 7

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
7.3.A . . . divide rational numbers fluently; and	Divide positive and negative rational numbers and interpret quotients in real-world contexts.
7.3.A . . . multiply . . . rational numbers fluently; and	Multiply positive and negative rational numbers and interpret products in real-world contexts.
7.3.A . . . subtract . . . rational numbers fluently; and	Subtract positive and negative rational numbers. Interpret rational number values on a number line, including subtraction expressions, and apply this principle in real-world contexts.
7.3.A add . . . rational numbers fluently; and	Add positive and negative rational numbers. Interpret rational number values on a number line, including addition expressions, and interpret sums of rational numbers in real-world contexts.
7.3.A add, subtract, multiply, and divide rational numbers fluently; and	Multiply multi-digit decimals.* Divide multi-digit whole numbers.* Divide multi-digit decimals.* Divide fractions.*
7.3.B apply and extend previous understandings of operations to solve problems using . . . division of rational numbers.	Divide positive and negative rational numbers and interpret quotients in real-world contexts.
7.3.B apply and extend previous understandings of operations to solve problems using . . . multiplication . . . of rational numbers.	Multiply positive and negative rational numbers and interpret products in real-world contexts.

**This skill is related to the aligned standard*

Grade 7 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
7.3.B apply and extend previous understandings of operations to solve problems using . . . subtraction . . . of rational numbers.	Interpret rational number values on a number line, including subtraction expressions, and apply this principle in real-world contexts.
7.3.B apply and extend previous understandings of operations to solve problems using addition . . . of rational numbers.	Interpret rational number values on a number line, including addition expressions, and interpret sums of rational numbers in real-world contexts.
7.3.B apply and extend previous understandings of operations to solve problems using addition, subtraction, multiplication, and division of rational numbers.	Solve mathematical problems involving the four operations with both positive and negative rational numbers, including complex fractions.
7.4.A represent constant rates of change in mathematical and real-world problems given pictorial, tabular, verbal, numeric, graphical, and algebraic representations, including d = rt;	Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.*
7.4.B calculate unit rates from rates in mathematical and real-world problems;	Compute unit rates associated with ratios of fractions.
7.4.C determine the constant of proportionality (k = y/x) within mathematical and real-world problems;	Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.
7.4.D solve problems involving . . . percents . . .	Solve problems involving percent of a number.
7.4.D solve problems involving ratios . . . and percents . . .	Solve multi-step ratio and percent problems.
7.4.D solve problems involving ratios, rates . . .	Solve problems using ratio and rate reasoning.
7.4.D solve problems involving ratios, rates, and percents, including multi-step problems involving percent increase and percent decrease, and financial literacy problems; and	Solve problems involving finding the whole, given a part and the percent.* Compute unit rates associated with ratios of fractions.*

**This skill is related to the aligned standard*

Grade 7 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	Solve problems involving unit rate.*
7.4.E convert between measurement systems, including the use of proportions and the use of unit rates.	Convert and compare customary and metric units of capacity involving whole-number measures.*
7.5.B describe # as the ratio of the circumference of a circle to its diameter; and	Use formulas to find the area and circumference of circles.*
7.5.C solve mathematical and real-world problems involving . . . scale drawings.	Use scale drawings to solve problems, including finding actual lengths and areas and creating different scales.
7.6.A represent sample spaces for simple and compound events using lists and tree diagrams;	Represent sample spaces for simple and compound events using organized lists, tables, and tree diagrams. Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.*
7.6.B select and use different simulations to represent simple and compound events with and without technology;	Develop and use a probability model with equal outcomes to determine probabilities of simple and compound events.* Compare probability models with observed frequencies.* Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.*
7.6.C make predictions and determine solutions using experimental data for simple and compound events;	Develop a probability model (which may not be uniform) from observed frequencies and use it to determine probabilities of simple and compound events. Use frequency data of an event to approximate the probability of that event.*

Grade 7 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
7.6.D make predictions and determine solutions using theoretical probability for simple and compound events;	Develop and use a probability model with equal outcomes to determine probabilities of simple and compound events.
7.6.F use data from a random sample to make inferences about a population;	Make inferences about a population given information drawn from a random sample of that population.
7.6.G solve problems using data represented in . . . dot plots . . .	Display numerical data in dot plots, draw inferences from the data, and describe patterns in the data.
7.6.H solve problems using qualitative and quantitative predictions and comparisons from simple experiments; and	Use frequency data of an event to approximate the probability of that event.*
7.6.I determine experimental and theoretical probabilities related to simple and compound events using data and sample spaces.	Use frequency data of an event to approximate the probability of that event.* Develop and use a probability model with equal outcomes to determine probabilities of simple and compound events.* Compare probability models with observed frequencies.* Develop a probability model (which may not be uniform) from observed frequencies and use it to determine probabilities of simple and compound events.* Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.*
7.8.A model the relationship between the volume of a rectangular prism and a rectangular pyramid having both congruent bases and heights and connect that relationship to the formulas;	Demonstrate an understanding of volume formulas and use them to solve problems involving* • Cylinders • Cones • Spheres

Grade 7 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	• Pyramids
7.8.B explain verbally and symbolically the relationship between the volume of a triangular prism and a triangular pyramid having both congruent bases and heights and connect that relationship to the formulas; and	Demonstrate an understanding of volume formulas and use them to solve problems involving* • Cylinders • Cones • Spheres • Pyramids
7.8.C use models to determine the approximate formulas for the circumference and area of a circle and connect the models to the actual formulas.	Use formulas to find the area and circumference of circles.*
7.9.A solve problems involving the volume of rectangular prisms . . .	Use a formula to find the volume of right rectangular prisms with fractional edge lengths. Use formulas to find the volume of three-dimensional objects composed of cubes and right prisms.
7.9.B determine the circumference and area of circles;	Use formulas to find the area and circumference of circles. Know the formulas for the area and circumference of a circle and use them to solve problems.*
7.9.C determine the area of composite figures containing combinations of rectangles, squares, parallelograms, trapezoids, triangles . . .	Solve problems involving composing and decomposing polygons into rectangles and triangles to find area. Use formulas to solve problems involving finding the area of two-dimensional figures composed of triangles, quadrilaterals, and polygons.
7.9.D solve problems involving the lateral and total surface area of a rectangular prism, rectangular pyramid, triangular	Use formulas to find the surface area of three-dimensional figures composed of

Grade 7 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
prism, and triangular pyramid by determining the area of the shape's net.	triangles, quadrilaterals, polygons, cubes, and right prisms.* Apply knowledge of nets of three-dimensional figures to solve real-world and mathematical problems involving spatial representation and surface area.*
7.10.A write one-variable, two-step . . . inequalities to represent constraints or conditions within problems;	Use variables to write inequalities for real-world and mathematical problems and solve by reasoning about the quantities.
7.10.A write one-variable, two-step equations . . . to represent constraints or conditions within problems;	Use variables to write equations for real-world problems and solve by reasoning about the quantities.
7.10.B represent solutions for one-variable, two-step equations and inequalities on number lines; and	Solve equations of the form $px + q = r$ or $p(x + q) = r$ where p, q, and r are rational numbers.* Solve and graph the solutions of inequalities of the form $px + q > r$ or $px + q < r$, where p, q, and r are rational numbers.*
7.11.A model and solve one-variable, two-step . . . inequalities;	Solve and graph the solutions of inequalities of the form $px + q > r$ or $px + q < r$, where p, q, and r are rational numbers.
7.11.A model and solve one-variable, two-step equations . . .	Solve equations of the form $px + q = r$ or $p(x + q) = r$ where p, q, and r are rational numbers.
7.11.B determine if the given value(s) make(s) one-variable, two-step equations and inequalities true; and	Use substitution to determine whether a solution to an equation is true.* Use substitution to determine whether a solution to an inequality is true.*
7.11.C write and solve equations using geometry concepts, including . . . angle relationships.	Use understanding of supplementary, complementary, vertical, and adjacent angles to find the measures of unknown angles in a figure.

**This skill is related to the aligned standard*

Grade 7 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
7.12.A compare two groups of numeric data using comparative dot plots or box plots by comparing their shapes, centers, and spreads;	Find, use, and interpret mean, median, mode, range, and maximum and minimum using data in box plots.* Display numerical data in dot plots, draw inferences from the data, and describe patterns in the data.* Display numerical data in box plots, draw inferences from the data, and describe patterns in the data.*
7.12.B use data from a random sample to make inferences about a population; and	Understand that random sampling tends to produce representative samples and identify samples that are representative of a population.*
7.12.C compare two populations based on data in random samples from these populations, including informal comparative inferences about differences between the two populations.	Compare inferences made from numerical data for two populations using measures of center and variability.*

Grade 8

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
8.2.A extend previous knowledge of sets and subsets using a visual representation to describe relationships between sets of real numbers;	Understand and identify irrational numbers.*
8.2.B approximate the value of an irrational number, including # and square roots of numbers less than 225, and locate that rational number approximation on a number line;	Use rational numbers to approximate and compare irrational numbers.* Compute with numbers expressed in scientific notation, including expressions with decimals.*
8.2.C convert between standard decimal notation and scientific notation; and	Express very small numbers, where the coefficient has two or more significant digits and the exponent is negative, and very large numbers, where the coefficient has two or more significant digits and the exponent is positive, in scientific notation. Compute with numbers expressed in scientific notation, including expressions with decimals.* Compute with numbers expressed as a single digit times an integer power of 10.*
8.3.C . . . explain the effect of a given . . . scale factor applied to two-dimensional figures on a coordinate plane with the origin as the center of dilation.	Describe a single dilation or a sequence of a dilation and a rotation, reflection, or translation that is used to create a pair of similar figures. [When presented on a coordinate plane, dilations are centered at the origin, reflections are over an axis, and translations are by whole number units.]
8.4.B graph proportional relationships, interpreting the unit rate as the slope of the line that models the relationship; and	Graph proportional relationships, interpreting the unit rate as the slope of the graph. Explain why the slope of a non-vertical line in the coordinate plane is the same between any two points on the line and use this

Grade 8 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	understanding to derive the slope-intercept form of an equation $y = mx + b$.*
8.4.C use data from a table or graph to determine the rate of change or slope and y-intercept in mathematical and real-world problems.	Find the rate of change and initial value of a function from a description or from a set of x and y values shown in a table or graph. Find the slope and y-intercept of a line and relate these to an equation in the form $y = mx + b$.*
8.5.A represent linear proportional situations with tables, graphs, and equations in the form of y = kx;	Solve equations of the form $px + q = r$ or $p(x + q) = r$ where p, q, and r are rational numbers.*
8.5.B represent linear non-proportional situations with tables, graphs, and equations in the form of y = mx + b, where b # 0;	Solve equations of the form $px + q = r$ or $p(x + q) = r$ where p, q, and r are rational numbers.* Model a linear relationship with a function.*
8.5.C contrast bivariate sets of data that suggest a linear relationship with bivariate sets of data that do not suggest a linear relationship from a graphical representation;	Use and understand the equation $y = mx + b$; identify a function as linear or not linear.* Analyze data on a scatter plot and determine a good model. * • Determine if a linear or exponential model is a good fit from a scatterplot of the data. • Determine a linear function that best fits data in a scatterplot that suggests a linear model or an exponential function that best fits data in a scatterplot that suggests an exponential model, and use the functions to estimate future trends. • Determine from a plot of the residuals of a scatterplot whether a linear model or exponential model is a good fit for the data.

**This skill is related to the aligned standard*

Grade 8 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
8.5.D use a trend line that approximates the linear relationship between bivariate sets of data to make predictions;	Identify a line of fit to model and analyze a relationship between two quantitative variables.* Solve problems by interpreting the slope and intercept in equations of linear models for data with two quantitative variables.* Analyze and interpret linear models in the context of measurement and data.* • Analyze and interpret the slope and intercepts of a linear model. • Use technology to determine the correlation coefficient of a linear fit and use the correlation coefficient to describe how well the model fits the data. • Identify associations of data that are based on correlation versus causation and explain the difference.
8.5.F distinguish between proportional and non-proportional situations using tables, graphs, and equations in the form y = kx or y = mx + b, where b # 0;	Distinguish between proportional and non-proportional situations. Compare two different proportional relationships expressed in different forms, such as tables, graphs, or equations.* Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.* Use an equation to represent a proportional relationship and interpret the meaning of a point on the graph of the equation.*
8.5.G identify functions using sets of ordered pairs, tables, mappings, and graphs;	Understand and identify functions as one-to-one and many-to-one relationships.

Grade 8 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	Describe a function shown in a graph; sketch a graph for a description of a function.*
8.5.H identify examples of proportional and non-proportional functions that arise from mathematical and real-world problems; and	Distinguish between proportional and non-proportional situations. Compare two different proportional relationships expressed in different forms, such as tables, graphs, or equations.* Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.* Use an equation to represent a proportional relationship and interpret the meaning of a point on the graph of the equation.*
8.5.I write an equation in the form y = mx + b to model a linear relationship between two quantities using verbal, numerical, tabular, and graphical representations.	Model a linear relationship with a function.* Use and understand the equation $y = mx + b$; identify a function as linear or not linear.*
8.6.A describe the volume formula V = Bh of a cylinder in terms of its base area and its height;	Use formulas to find the volume of cones, cylinders, and spheres.* Demonstrate an understanding of volume formulas and use them to solve problems involving* • Cylinders • Cones • Spheres • Pyramids
8.6.B model the relationship between the volume of a cylinder and a cone having both congruent bases and heights and	Use formulas to find the volume of cones, cylinders, and spheres.*

Grade 8 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
connect that relationship to the formulas; and	
8.6.C use models and diagrams to explain the Pythagorean theorem.	Explain the steps of a proof of the Pythagorean Theorem and its converse. Use the Pythagorean theorem to solve problems involving right triangles.*
8.7.A solve problems involving the volume of cylinders, cones, and spheres;	Use formulas to find the volume of cones, cylinders, and spheres.
8.7.B use previous knowledge of surface area to make connections to the formulas for lateral and total surface area and determine solutions for problems involving rectangular prisms, triangular prisms, and cylinders;	Use formulas to find the surface area of three-dimensional figures composed of triangles, quadrilaterals, polygons, cubes, and right prisms.
8.7.C use the Pythagorean Theorem and its converse to solve problems; and	Use the Pythagorean theorem to solve problems involving right triangles.* Apply the Pythagorean theorem to calculate the distance between two points on a coordinate grid.*
8.7.D determine the distance between two points on a coordinate plane using the Pythagorean Theorem.	Apply the Pythagorean theorem to calculate the distance between two points on a coordinate grid.
8.8.A write one-variable equations or inequalities with variables on both sides that represent problems using rational number coefficients and constants;	Use variables to write equations for real-world problems and solve by reasoning about the quantities.* Use variables to write inequalities for real-world and mathematical problems and solve by reasoning about the quantities.*
8.8.C model and solve one-variable equations with variables on both sides of the equal sign that represent mathematical and real-world problems using rational number coefficients and constants; and	Solve equations of the form $px + q = r$ or $p(x + q) = r$ where p, q, and r are rational numbers.*

Grade 8 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	Use variables to write equations for real-world problems and solve by reasoning about the quantities.* Solve and graph the solutions of inequalities of the form $px + q > r$ or $px + q < r$, where p, q, and r are rational numbers.* Use variables to write inequalities for real-world and mathematical problems and solve by reasoning about the quantities.*
8.8.D use informal arguments to establish facts about the angle sum and exterior angle of triangles, the angles created when parallel lines are cut by a transversal . . .	Explain facts about the angle sum and exterior angles of triangles and angles formed by parallel lines cut by a transversal.
8.8.D use informal arguments to establish facts about the angle sum and exterior angle of triangles, the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles.	Find unknown measures of interior and exterior angles of triangles, and use this information to identify similar triangles.* Given the measures of three sides or three angles, determine what type of triangle, if any, can be formed.* Use understanding of supplementary, complementary, vertical, and adjacent angles to find the measures of unknown angles in a figure.*
8.10.A generalize the properties of orientation . . . of rotations, reflections, translations, and dilations of two-dimensional shapes on a coordinate plane;	Describe a single dilation or a sequence of a dilation and a rotation, reflection, or translation that is used to create a pair of similar figures. [When presented on a coordinate plane, dilations are centered at the origin, reflections are over an axis, and translations are by whole number units.]
8.10.A generalize the properties of orientation and congruence of rotations, reflections, translations, and dilations of	Demonstrate a fundamental understanding of congruence as it relates to

Grade 8 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
two-dimensional shapes on a coordinate plane;	transformations of rigid motions, including those involving triangles.* • Describe translations, rotations, and reflections using geometric terms, and predict the impact of these transformations on figures. Use the definition of congruence in terms of rigid motions to decide if two figures are congruent. • Show that two triangles are congruent if and only if the corresponding sides and angles are congruent using the definition of congruence in terms of rigid motions. • Using congruence in terms of rigid motions, show how the congruence criteria for triangles (ASA, SAS, and SSS) follows.
8.10.A generalize the properties of orientation and congruence of rotations, reflections, [and] translations . . . of two-dimensional shapes on a coordinate plane;	Describe the results of rotations, reflections, and translations as they relate to points, line segments, and angles of two-dimensional figures. [When presented on a coordinate plane, rotations are about the origin, reflections are over an axis, and translations are by whole number units.] Describe a single rotation, reflection, or translation, or a sequence of two of these transformations that is used to create a pair of congruent figures. [When presented on a coordinate plane, rotations are about the origin, reflections are over an axis, and translations are by whole number units.]
8.10.B differentiate between transformations that preserve congruence and those that do not;	Describe a single rotation, reflection, or translation, or a sequence of two of these transformations that is used to create a pair of congruent figures. [When presented on a coordinate plane, rotations are about the

**This skill is related to the aligned standard*

Grade 8 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	origin, reflections are over an axis, and translations are by whole number units.]* Describe a single dilation or a sequence of a dilation and a rotation, reflection, or translation that is used to create a pair of similar figures. [When presented on a coordinate plane, dilations are centered at the origin, reflections are over an axis, and translations are by whole number units.]* Demonstrate a fundamental understanding of congruence as it relates to transformations of rigid motions, including those involving triangles.* • Describe translations, rotations, and reflections using geometric terms, and predict the impact of these transformations on figures. Use the definition of congruence in terms of rigid motions to decide if two figures are congruent. • Show that two triangles are congruent if and only if the corresponding sides and angles are congruent using the definition of congruence in terms of rigid motions. • Using congruence in terms of rigid motions, show how the congruence criteria for triangles (ASA, SAS, and SSS) follows.
8.10.C explain the effect of translations, reflections over the x- or y-axis, and rotations limited to 90°, 180°, 270°, and 360° as applied to two-dimensional shapes on a coordinate plane . . .	Describe a single rotation, reflection, or translation, or a sequence of two of these transformations that is used to create a pair of congruent figures. [When presented on a coordinate plane, rotations are about the origin, reflections are over an axis, and translations are by whole number units.]

Grade 8 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	Describe the results of rotations, reflections, and translations as they relate to points, line segments, and angles of two-dimensional figures. [When presented on a coordinate plane, rotations are about the origin, reflections are over an axis, and translations are by whole number units.]
8.10.C explain the effect of translations, reflections over the x- or y-axis, and rotations limited to 90°, 180°, 270°, and 360° as applied to two-dimensional shapes on a coordinate plane using an algebraic representation; and	Describe a single dilation or a sequence of a dilation and a rotation, reflection, or translation that is used to create a pair of similar figures. [When presented on a coordinate plane, dilations are centered at the origin, reflections are over an axis, and translations are by whole number units.]* Demonstrate a fundamental understanding of congruence as it relates to transformations of rigid motions, including those involving triangles.* • Describe translations, rotations, and reflections using geometric terms, and predict the impact of these transformations on figures. Use the definition of congruence in terms of rigid motions to decide if two figures are congruent. • Show that two triangles are congruent if and only if the corresponding sides and angles are congruent using the definition of congruence in terms of rigid motions. • Using congruence in terms of rigid motions, show how the congruence criteria for triangles (ASA, SAS, and SSS) follows.
8.10.D model the effect on linear and area measurements of dilated two-dimensional shapes.	Describe a single dilation or a sequence of a dilation and a rotation, reflection, or translation that is used to create a pair of similar figures. [When presented on a

Grade 8 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	coordinate plane, dilations are centered at the origin, reflections are over an axis, and translations are by whole number units.]*
8.11.A construct a scatterplot and describe the observed data to address questions of association such as linear, non-linear, and no association between bivariate data;	Construct and describe patterns in scatter plots, such as clustering, outliers, positive or negative association, and linear or non-linear association.
8.11.B determine the mean absolute deviation and use this quantity as a measure of the average distance data are from the mean using a data set of no more than 10 data points; and	Use mean absolute deviation to describe the variability of data and explain deviations from overall pattern in context.
8.11.C simulate generating random samples of the same size from a population with known characteristics to develop the notion of a random sample being representative of the population from which it was selected	Understand that random sampling tends to produce representative samples and identify samples that are representative of a population.*

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
8-9.2.A determine the domain and range of a linear function in mathematical problems; determine reasonable domain and range values for real-world situations, both continuous and discrete; and represent domain and range using inequalities;	Demonstrate an understanding of functions, apply functional notation, and evaluate functions. * • Understand the definition of a function in terms of its domain and range; Understand that f(x) denotes the graph of the ordered pairs of the output (the y-coordinates) corresponding to the input (the x-coordinates). • Use function notation to interpret linear and exponential functions and parts of these functions in real-world contexts. Evaluate linear and exponential functions given inputs from their domains. • Recognize that geometric and arithmetic sequences are functions that are defined by determining the next number in the sequence (i.e., recursively). Describe the relationship between terms in a recursive sequence. Interpret linear and exponential functions in real-world and mathematical situations. * • For a linear or exponential function, interpret key features of graphs and tables in terms of the intercepts and the intervals on which the function is increasing or decreasing. • Sketch graphs of functions given the intercepts, the intervals on which the function is increasing or decreasing, and the end behavior. • Determine an appropriate domain of a function and describe its effect on the graph. • Determine the average rate of change of a linear or exponential function over a specified interval using an equation

Grades 8 - 9 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	or table, or estimate the rate of change using a graph.
8-9.2.B write linear equations in two variables in various forms, including y = mx + b, Ax + By = C, and y - y# = m(x - x#), given one point and the slope and given two points;	Construct new representations of functions from algebraic, graphic, numerical, or verbal representations of linear and exponential functions. * • Determine an algebraic expression or steps for calculation of a linear or exponential function that model real world situations. • Create new functions by using arithmetic operations on functions. • Write an algebraic expression or steps for calculation to determine terms in arithmetic and geometric sequences and convert from one representation to the other.
8-9.2.C write linear equations in two variables given a table of values, a graph, and a verbal description;	Construct new representations of functions from algebraic, graphic, numerical, or verbal representations of linear and exponential functions. * • Determine an algebraic expression or steps for calculation of a linear or exponential function that model real world situations. • Create new functions by using arithmetic operations on functions. • Write an algebraic expression or steps for calculation to determine terms in arithmetic and geometric sequences and convert from one representation to the other.
8-9.2.E write the equation of a line that contains a given point and is parallel to a given line;	Construct new representations of functions from algebraic, graphic, numerical, or verbal representations of linear and exponential functions. * • Determine an algebraic expression or steps for calculation of a linear or

Grades 8 - 9 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	exponential function that model real world situations. • Create new functions by using arithmetic operations on functions. • Write an algebraic expression or steps for calculation to determine terms in arithmetic and geometric sequences and convert from one representation to the other.
8-9.2.F write the equation of a line that contains a given point and is perpendicular to a given line;	Construct new representations of functions from algebraic, graphic, numerical, or verbal representations of linear and exponential functions. * • Determine an algebraic expression or steps for calculation of a linear or exponential function that model real world situations. • Create new functions by using arithmetic operations on functions. • Write an algebraic expression or steps for calculation to determine terms in arithmetic and geometric sequences and convert from one representation to the other.
8-9.2.G write an equation of a line that is parallel or perpendicular to the X or Y axis and determine whether the slope of the line is zero or undefined;	Use coordinate geometry to prove geometric theorems and to solve real-world and mathematical problems.* • Prove simple geometric theorems using the rectangular coordinate system. • Prove that lines with the same slope are either the same line or parallel lines; Prove that lines are perpendicular if and only if the slopes have a product of -1. Find the equation of a line parallel or perpendicular to a given line through a specified point. • Find the perimeters of polygons and areas of triangles and rectangles using the rectangular coordinate system.

Grades 8 - 9 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
8-9.3.A determine the slope of a line given a table of values, a graph, two points on the line, and an equation written in various forms, including y = mx + b, Ax + By = C, and y - y# = m(x - x#);	Find the slope and *y*-intercept of a line and relate these to an equation in the form $y = mx + b$.*
8-9.3.B calculate the rate of change of a linear function represented tabularly, graphically, or algebraically in context of mathematical and real-world problems;	Find the slope and *y*-intercept of a line and relate these to an equation in the form $y = mx + b$.*
8-9.3.C graph linear functions on the coordinate plane and identify key features, including including x-intercept [and] y-intercept . . .	Analyze, compare, and contrast representations of linear, exponential and quadratic functions. • Graph linear functions and specify intercepts. • Graph exponential functions, specify intercepts and explain end behavior. • Graph quadratic functions and specify intercepts. • Compare and contrast two linear, simple exponential, and/or quadratic functions, each represented in a different way.
8-9.3.C graph linear functions on the coordinate plane and identify key features, including x-intercept, y-intercept, zeros, and slope, in mathematical and real-world problems;	Represent linear, quadratic, and simple exponential relationships as algebraic equations and inequalities to solve mathematical and real-world problems. * • Create linear, quadratic, and simple exponential equations and inequalities in one variable and use them to solve problems. • Create linear, quadratic, and simple exponential equations in two or more variables to represent relationships between quantities; graph linear, quadratic, and simple exponential equations on coordinate axes with labels and scales. • Represent constraints by linear equations or inequalities, and by systems of linear

**This skill is related to the aligned standard*

Grades 8 - 9 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. Represent and solve linear, quadratic, and simple exponential equations graphically. * • Demonstrate an understanding that the graph of an equation in two variables is the set of all the ordered pairs in the coordinate plane that are solutions to the equation. • Recognize that when the graphs of two functions intersect, the x-value of the point of intersection produces the same y-value in both functions such that f(x)=g(x); estimate these intersections by graphing, creating tables of x- and y- values, or finding successive approximations. [Functions are limited to linear and linear, exponential and exponential, linear and exponential.] • Graph half-planes to represent linear inequalities in two variables; graph the solution set to a system of linear inequalities in two variables as the intersection of half-planes.
8-9.3.D graph the solution set of linear inequalities in two variables on the coordinate plane;	Represent and solve linear, quadratic, and simple exponential equations graphically. • Demonstrate an understanding that the graph of an equation in two variables is the set of all the ordered pairs in the coordinate plane that are solutions to the equation. • Recognize that when the graphs of two functions intersect, the x-value of the point of intersection produces the same y-value in both functions such that f(x)=g(x); estimate these intersections by graphing, creating tables

Grades 8 - 9 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	of x- and y- values, or finding successive approximations. [Functions are limited to linear and linear, exponential and exponential, linear and exponential.] • Graph half-planes to represent linear inequalities in two variables; graph the solution set to a system of linear inequalities in two variables as the intersection of half-planes.
8-9.3.F graph systems of two linear equations . . . and determine the solutions if they exist;	Find solutions to systems of linear equations, including those with one solution, no solution, or infinitely many solutions, by graphing the equations.
8-9.3.F graph systems of two linear equations in two variables on the coordinate plane and determine the solutions if they exist;	Solve systems of linear equations using graphing and linear combination. * • Show that linear combination results in one solution, infinitely many solutions or no solution that is shared by both lines. • Solve systems of linear equations algebraically and graphically.
8-9.3.G estimate graphically the solutions to systems of two linear equations with two variables in real-world problems; and	Find solutions to systems of linear equations, including those with one solution, no solution, or infinitely many solutions, by graphing the equations.* Solve systems of linear equations using graphing and linear combination. * • Show that linear combination results in one solution, infinitely many solutions or no solution that is shared by both lines. • Solve systems of linear equations algebraically and graphically.
8-9.3.H graph the solution set of systems of two linear inequalities in two variables on the coordinate plane.	Represent and solve linear, quadratic, and simple exponential equations graphically. • Demonstrate an understanding that the graph of an equation in two variables is the set of all the ordered pairs in the

Grades 8 - 9 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	coordinate plane that are solutions to the equation. • Recognize that when the graphs of two functions intersect, the x-value of the point of intersection produces the same y-value in both functions such that f(x)=g(x); estimate these intersections by graphing, creating tables of x- and y- values, or finding successive approximations. [Functions are limited to linear and linear, exponential and exponential, linear and exponential.] • Graph half-planes to represent linear inequalities in two variables; graph the solution set to a system of linear inequalities in two variables as the intersection of half-planes.
8-9.4.A calculate, using technology, the correlation coefficient between two quantitative variables and interpret this quantity as a measure of the strength of the linear association;	Analyze and interpret linear models in the context of measurement and data.* • Analyze and interpret the slope and intercepts of a linear model. • Use technology to determine the correlation coefficient of a linear fit and use the correlation coefficient to describe how well the model fits the data. • Identify associations of data that are based on correlation versus causation and explain the difference.
8-9.4.B compare and contrast association and causation in real-world problems; and	Analyze and interpret linear models in the context of measurement and data.* • Analyze and interpret the slope and intercepts of a linear model. • Use technology to determine the correlation coefficient of a linear fit and use the correlation coefficient to describe how well the model fits the data.

**This skill is related to the aligned standard*

Grades 8 - 9 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	• Identify associations of data that are based on correlation versus causation and explain the difference.
8-9.4.C write . . . linear [or exponential] functions that provide a reasonable fit to data to estimate solutions and make predictions for real-world problems.	Analyze data on a scatter plot and determine a good model. • Determine if a linear or exponential model is a good fit from a scatterplot of the data. • Determine a linear function that best fits data in a scatterplot that suggests a linear model or an exponential function that best fits data in a scatterplot that suggests an exponential model, and use the functions to estimate future trends. • Determine from a plot of the residuals of a scatterplot whether a linear model or exponential model is a good fit for the data.
8-9.4.C write, with and without technology, linear functions that provide a reasonable fit to data to estimate solutions and make predictions for real-world problems.	Identify a line of fit to model and analyze a relationship between two quantitative variables.*
8-9.5.A solve linear equations in one variable, including those for which the application of the distributive property is necessary and for which variables are included on both sides;	Solve linear equations in one variable with one solution, infinitely many solutions, or no solutions. Solve linear equations with positive and negative rational coefficients by expanding expressions and collecting like terms. Solve linear and literal equations and inequalities for one variable.
8-9.5.C solve systems of two linear equations . . . for mathematical . . . problems.	Find solutions to systems of linear equations, including those with one solution, no solution, or infinitely many solutions, by graphing the equations.

**This skill is related to the aligned standard*

Grades 8 - 9 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
8-9.5.C solve systems of two linear equations with two variables for mathematical and real-world problems.	Solve systems of linear equations using graphing and linear combination. • Show that linear combination results in one solution, infinitely many solutions or no solution that is shared by both lines. • Solve systems of linear equations algebraically and graphically. Solve systems of equations algebraically. * Solve real-world problems using systems of equations.*
8-9.6.A determine the domain and range of quadratic functions and represent the domain and range using inequalities;	Interpret linear and exponential functions in real-world and mathematical situations. * • For a linear or exponential function, interpret key features of graphs and tables in terms of the intercepts and the intervals on which the function is increasing or decreasing. • Sketch graphs of functions given the intercepts, the intervals on which the function is increasing or decreasing, and the end behavior. • Determine an appropriate domain of a function and describe its effect on the graph. • Determine the average rate of change of a linear or exponential function over a specified interval using an equation or table, or estimate the rate of change using a graph. Interpret quadratic functions in real-world and mathematical situations. * • For quadratic functions, interpret models represented as graphs and tables in terms of the intercepts, maxima, minima, and

Grades 8 - 9 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	intervals where the function is increasing and decreasing. • Sketch graphs of functions given the intercepts, intervals on which the function is increasing or decreasing, symmetry, end behavior, and a maximum or a minimum of the graph. • Determine an appropriate domain of a function for its graph, using only functions that could be modeled by quadratic functions or exponential functions with rational exponents. • Determine the average rate of change over a specified interval of a quadratic or exponential function with rational exponents using an equation or table. • Estimate the average rate of change over a specified interval of a quadratic or exponential function with rational exponents using a graph.
8-9.7.A graph quadratic functions on the coordinate plane and use the graph to identify key attributes, if possible, including x-intercept, y-intercept, . . . maximum value, [and] minimum values . . .	Analyze, compare, and contrast representations of linear, exponential and quadratic functions. • Graph linear functions and specify intercepts. • Graph exponential functions, specify intercepts and explain end behavior. • Graph quadratic functions and specify intercepts. • Compare and contrast two linear, simple exponential, and/or quadratic functions, each represented in a different way.
8-9.7.A graph quadratic functions on the coordinate plane and use the graph to identify key attributes, if possible, including x-intercept, y-intercept, zeros, maximum value, minimum values, vertex, and the equation of the axis of symmetry;	Interpret quadratic functions in real-world and mathematical situations. * • For quadratic functions, interpret models represented as graphs and tables in terms of the intercepts, maxima, minima, and intervals where the function is increasing and decreasing.

Grades 8 - 9 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	• Sketch graphs of functions given the intercepts, intervals on which the function is increasing or decreasing, symmetry, end behavior, and a maximum or a minimum of the graph. • Determine an appropriate domain of a function for its graph, using only functions that could be modeled by quadratic functions or exponential functions with rational exponents. • Determine the average rate of change over a specified interval of a quadratic or exponential function with rational exponents using an equation or table. • Estimate the average rate of change over a specified interval of a quadratic or exponential function with rational exponents using a graph.
8-9.7.B describe the relationship between the linear factors of quadratic expressions and the zeros of their associated quadratic functions; and	Interpret quadratic functions in real-world and mathematical situations. * • For quadratic functions, interpret models represented as graphs and tables in terms of the intercepts, maxima, minima, and intervals where the function is increasing and decreasing. • Sketch graphs of functions given the intercepts, intervals on which the function is increasing or decreasing, symmetry, end behavior, and a maximum or a minimum of the graph. • Determine an appropriate domain of a function for its graph, using only functions that could be modeled by quadratic functions or exponential functions with rational exponents. • Determine the average rate of change over a specified interval of a quadratic or exponential function with rational exponents using an equation or table.

**This skill is related to the aligned standard*

Grades 8 - 9 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	• Estimate the average rate of change over a specified interval of a quadratic or exponential function with rational exponents using a graph.
8-9.8.A solve quadratic equations having real solutions by fact. . . completing the square . . .	Use inspection and completing the square to solve quadratic equations.
8-9.8.A solve quadratic equations having real solutions by factoring, taking square roots, completing the square, and applying the quadratic formula; and	Analyze, perform operations, and solve quadratic expressions and equations. * • Factor quadratic expressions. • Determine the maximum or minimum of a quadratic function by completing the square.
8-9.8.B write, using technology, quadratic functions that provide a reasonable fit to data to estimate solutions and make predictions for real-world problems.	Interpret quadratic functions in real-world and mathematical situations. * • For quadratic functions, interpret models represented as graphs and tables in terms of the intercepts, maxima, minima, and intervals where the function is increasing and decreasing. • Sketch graphs of functions given the intercepts, intervals on which the function is increasing or decreasing, symmetry, end behavior, and a maximum or a minimum of the graph. • Determine an appropriate domain of a function for its graph, using only functions that could be modeled by quadratic functions or exponential functions with rational exponents. • Determine the average rate of change over a specified interval of a quadratic or exponential function with rational exponents using an equation or table. • Estimate the average rate of change over a specified interval of a quadratic or exponential function with rational exponents using a graph.

**This skill is related to the aligned standard*

Grades 8 - 9 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
8-9.9.A determine the domain and range of exponential functions of the form f(x) = ab to the x power and represent the domain and range using inequalities;	Demonstrate an understanding of functions, apply functional notation, and evaluate functions. * • Understand the definition of a function in terms of its domain and range; Understand that f(x) denotes the graph of the ordered pairs of the output (the y-coordinates) corresponding to the input (the x-coordinates). • Use function notation to interpret linear and exponential functions and parts of these functions in real-world contexts. Evaluate linear and exponential functions given inputs from their domains. • Recognize that geometric and arithmetic sequences are functions that are defined by determining the next number in the sequence (i.e., recursively). Describe the relationship between terms in a recursive sequence.
8-9.9.B interpret the meaning of the values of a and b in exponential functions of the form f(x) = ab to the x power in real-world problems;	Demonstrate an understanding of functions, apply functional notation, and evaluate functions. * • Understand the definition of a function in terms of its domain and range; Understand that f(x) denotes the graph of the ordered pairs of the output (the y-coordinates) corresponding to the input (the x-coordinates). • Use function notation to interpret linear and exponential functions and parts of these functions in real-world contexts. Evaluate linear and exponential functions given inputs from their domains. • Recognize that geometric and arithmetic sequences are functions that are defined by determining the next number in the

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	sequence (i.e., recursively). Describe the relationship between terms in a recursive sequence. Interpret linear and exponential functions in real-world and mathematical situations. * • For a linear or exponential function, interpret key features of graphs and tables in terms of the intercepts and the intervals on which the function is increasing or decreasing. • Sketch graphs of functions given the intercepts, the intervals on which the function is increasing or decreasing, and the end behavior. • Determine an appropriate domain of a function and describe its effect on the graph. • Determine the average rate of change of a linear or exponential function over a specified interval using an equation or table, or estimate the rate of change using a graph.
8-9.9.C write exponential functions in the form f(x) = ab to the x power (where b is a rational number) to describe problems arising from mathematical and real-world situations, including growth and decay;	Construct new representations of functions from algebraic, graphic, numerical, or verbal representations of linear and exponential functions. * • Determine an algebraic expression or steps for calculation of a linear or exponential function that model real world situations. • Create new functions by using arithmetic operations on functions. • Write an algebraic expression or steps for calculation to determine terms in arithmetic and geometric sequences and convert from one representation to the other.

Grades 8 - 9 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
8-9.9.D graph exponential functions . . . and identify key features, including y-intercept . . .	Graphically solve systems of equations or inequalities, using linear, polynomial, rational, radical, absolute value, exponential and/or logarithmic equations or inequalities. [Systems do not include linear and linear; exponential and exponential; or linear and exponential equations. Linear and exponential are used in conjunction with one of the other types.]
8-9.9.D graph exponential functions that model growth and decay and identify key features, including y-intercept and asymptote, in mathematical and real-world problems; and	Analyze, compare, and contrast representations of linear, exponential and quadratic functions. * • Graph linear functions and specify intercepts. • Graph exponential functions, specify intercepts and explain end behavior. • Graph quadratic functions and specify intercepts. • Compare and contrast two linear, simple exponential, and/or quadratic functions, each represented in a different way.
8-9.9.E write . . . [linear or] exponential functions that provide a reasonable fit to data and make predictions for real-world problems.	Analyze data on a scatter plot and determine a good model. • Determine if a linear or exponential model is a good fit from a scatterplot of the data. • Determine a linear function that best fits data in a scatterplot that suggests a linear model or an exponential function that best fits data in a scatterplot that suggests an exponential model, and use the functions to estimate future trends. • Determine from a plot of the residuals of a scatterplot whether a linear model or exponential model is a good fit for the data.
8-9.10.A add and subtract polynomials of degree one and degree two;	Add, subtract, and multiply polynomials.*

**This skill is related to the aligned standard*

Grades 8 - 9 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
8-9.10.B multiply polynomials of degree one and degree two;	Add, subtract, and multiply polynomials.*
8-9.10.E factor, if possible, trinomials with real factors in the form $ax^2 + bx + c$, including perfect square trinomials of degree two; and	Analyze, perform operations, and solve quadratic expressions and equations. * • Factor quadratic expressions. • Determine the maximum or minimum of a quadratic function by completing the square.
8-9.12.A decide whether relations represented verbally, tabularly, graphically, and symbolically define a function;	Demonstrate an understanding of functions, apply functional notation, and evaluate functions. * • Understand the definition of a function in terms of its domain and range; Understand that f(x) denotes the graph of the ordered pairs of the output (the y-coordinates) corresponding to the input (the x-coordinates). • Use function notation to interpret linear and exponential functions and parts of these functions in real-world contexts. Evaluate linear and exponential functions given inputs from their domains. • Recognize that geometric and arithmetic sequences are functions that are defined by determining the next number in the sequence (i.e., recursively). Describe the relationship between terms in a recursive sequence.
8-9.12.B evaluate functions, expressed in function notation, given one or more elements in their domains;	Demonstrate an understanding of functions, apply functional notation, and evaluate functions. • Understand the definition of a function in terms of its domain and range; Understand that f(x) denotes the graph of the ordered pairs of the output (the y-coordinates) corresponding to the input (the x-coordinates).

**This skill is related to the aligned standard*

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	• Use function notation to interpret linear and exponential functions and parts of these functions in real-world contexts. Evaluate linear and exponential functions given inputs from their domains. • Recognize that geometric and arithmetic sequences are functions that are defined by determining the next number in the sequence (i.e., recursively). Describe the relationship between terms in a recursive sequence.
8-9.12.C identify terms of arithmetic and geometric sequences when the sequences are given in function form using recursive processes;	Construct new representations of functions from algebraic, graphic, numerical, or verbal representations of linear and exponential functions. * • Determine an algebraic expression or steps for calculation of a linear or exponential function that model real world situations. • Create new functions by using arithmetic operations on functions. • Write an algebraic expression or steps for calculation to determine terms in arithmetic and geometric sequences and convert from one representation to the other.
8-9.12.D write a formula for the nth term of arithmetic and geometric sequences, given the value of several of their terms; and	Construct new representations of functions from algebraic, graphic, numerical, or verbal representations of linear and exponential functions. * • Determine an algebraic expression or steps for calculation of a linear or exponential function that model real world situations. • Create new functions by using arithmetic operations on functions. • Write an algebraic expression or steps for calculation to determine terms in

Grades 8 - 9 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	arithmetic and geometric sequences and convert from one representation to the other.
8-9.12.E solve mathematic and scientific formulas, and other literal equations, for a specified variable.	Solve literal formulas for a specific variable.

Grades 9 - 12

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
9-12.2.A graph the functions f(x)=#x, f(x)=1/x, f(x)=x^3, f(x)= $\sqrt[3]{x}$, f(x)=b to the x power, f(x)=|x|, and f(x)=logb (x) . . . , and, when applicable, . . . [identify] the key attributes such as . . . intercepts, . . . asymptotic behavior, and maximum and minimum . . .	Graphically solve systems of equations or inequalities, using linear, polynomial, rational, radical, absolute value, exponential and/or logarithmic equations or inequalities. [Systems do not include linear and linear; exponential and exponential; or linear and exponential equations. Linear and exponential are used in conjunction with one of the other types.]
9-12.2.A graph the functions f(x)=#x, f(x)=1/x, f(x)=x^3, f(x)= $\sqrt[3]{x}$, f(x)=b to the x power, f(x)=|x|, and f(x)=logb (x) . . . , and, when applicable, analyze the key attributes such as domain, range, intercepts, . . . asymptotic behavior, and maximum and minimum . . .	Graph square root, cube root, piece-wise-defined, step-, absolute-value, logarithmic, trigonometric, and rational functions. • Graph a variety of functions including square root, cube root, piece-wise-defined, step, and absolute value functions. • Graph polynomial functions of degree 3 or greater; identify the intercepts and describe end-behavior. • Graph logarithmic functions; identify and interpret intercepts, asymptotes, and end-behavior. • Graph trigonometric functions; identify and interpret midline, periodicity, amplitude, phase shift, and intercepts. • Determine an appropriate domain and range of a logarithmic or trigonometric function and relate them to its graph. • Graph rational functions; identify points of discontinuity, asymptotes, and end-behavior.
9-12.2.A graph the functions f(x)=#x, f(x)=1/x, f(x)=x^3, f(x)= $\sqrt[3]{x}$, f(x)=b to the x power, f(x)=|x|, and f(x)=logb (x) where b is 2, 10, and e, and, when applicable, analyze the key attributes such as domain, range, intercepts, symmetries, asymptotic	Interpret a variety of functions, including radical, piece-wise defined, step, absolute value, polynomial (degree 3 or higher), and/or rational functions, in real-world and mathematical situations. * • For radical, piece-wise defined, step, absolute value, polynomial (degree 3

Grades 9 - 12 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
behavior, and maximum and minimum given an interval;	or higher), and/or rational functions, interpret models represented as graphs and tables in terms of intercepts; intervals on which the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; and end behavior. • Sketch graphs of radical, piece-wise defined, step, absolute value, polynomial (degree 3 or higher), and/or rational functions using the intercepts; intervals on which the function is increasing or decreasing; intervals on which the function is positive or negative; symmetry; end behavior; and any maximums or minimums of the graphs. • Determine an appropriate domain of a function and relate it to its graph. Use only functions that could be modeled by radical, piece-wise defined, step, absolute value, polynomial (degree 3 or higher), and/or rational functions. • Determine and interpret the average rate of change of a radical, piece-wise defined, step, absolute value, polynomial (degree 3 or higher), and/or rational function presented in an equation or table over a specified interval. • Estimate the rate of change of a radical, piece-wise defined, step, absolute value, polynomial (degree 3 or higher), and/or rational function from a graph over a specified interval.
9-12.2.B . . . write the inverse of a [linear or quadratic] function . . .	Determine whether a linear or quadratic function has an inverse that is also a function, and if so, write the inverse function.

Grades 9 - 12 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
9-12.2.B . . . write the inverse of a [simple exponential, radical, absolute value, polynomial (degree 3 or greater), rational or logarithmic] function . . .	Determine whether an exponential, simple radical, absolute value, polynomial (degree 3 or greater), rational, or logarithmic function has an inverse that is also a function, and if so, write an expression or equation for the inverse.
9-12.2.B graph and write the inverse of a function using notation such as $f^{-1}(x)$;	Demonstrate an understanding of the connection between exponential and logarithmic relationships. * • Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents. • Translate between logarithmic equations of base 2, 10 or e, and their exponential forms. • Translate between equivalent forms of logarithmic equations.
9-12.2.C describe and analyze the relationship between a function and its inverse (quadratic and square root, logarithmic and exponential), including the restriction(s) on domain, which will restrict its range; and	Determine whether a linear or quadratic function has an inverse that is also a function, and if so, write the inverse function.* Demonstrate an understanding of the connection between exponential and logarithmic relationships. * • Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents. • Translate between logarithmic equations of base 2, 10 or e, and their exponential forms. • Translate between equivalent forms of logarithmic equations.
9-12.2.D use the composition of two functions, including the necessary	Construct new representations of a variety of functions from algebraic, graphical, numerical, or verbal representations. *

Grades 9 - 12 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
restrictions on the domain, to determine if the functions are inverses of each other.	• Create new functions using arithmetic operations by combining standard functions, such as linear functions, exponential functions, quadratic functions, square and cube root functions, polynomial functions, rational functions, logarithmic functions, absolute value functions, piece-wise defined functions, step functions, etc. • Demonstrate an understanding of composition of functions; state the domain and range for newly composed functions and represent functions that are compositions of functions algebraically.
9-12.3.A formulate systems of equations, including systems consisting of three linear equations in three variables and systems consisting of two equations, the first linear and the second quadratic;	Represent all kinds of relationships, including simple root functions, as algebraic equations to solve mathematical and real-world problems. * • Create equations and inequalities in one variable that may include simple rational, exponential, and root functions and use them to solve problems • Create equations in two or more variables that model complex situations and graph them on the coordinate plane. • Solve systems of equations and inequalities that model complex situations, and interpret the results. • Solve literal functions that model complex situations for a specific variable, including formulas involving simple roots.
9-12.3.C solve, algebraically, systems of two equations in two variables consisting of a linear equation and a quadratic equation;	Represent all kinds of relationships, including simple root functions, as algebraic equations to solve mathematical and real-world problems. * • Create equations and inequalities in one variable that may include simple

Grades 9 - 12 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	rational, exponential, and root functions and use them to solve problems • Create equations in two or more variables that model complex situations and graph them on the coordinate plane. • Solve systems of equations and inequalities that model complex situations, and interpret the results. • Solve literal functions that model complex situations for a specific variable, including formulas involving simple roots.
9-12.3.D determine the reasonableness of solutions to systems of a linear equation and a quadratic equation in two variables;	Represent all kinds of relationships, including simple root functions, as algebraic equations to solve mathematical and real-world problems. * • Create equations and inequalities in one variable that may include simple rational, exponential, and root functions and use them to solve problems • Create equations in two or more variables that model complex situations and graph them on the coordinate plane. • Solve systems of equations and inequalities that model complex situations, and interpret the results. • Solve literal functions that model complex situations for a specific variable, including formulas involving simple roots.
9-12.4.B write the equation of a parabola using given attributes, including vertex, focus, directrix, axis of symmetry, and direction of opening;	Derive equations of simple conic sections: parabolas and circles.* • Use the Pythagorean theorem to derive the equation of a circle. • Find the center and radius of a circle given by completing the square. • Given the focus and directrix, derive the equation of a parabola.

Grades 9 - 12 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
9-12.4.C determine the effect on the graph of f(x) = #x when f(x) is replaced by af(x), f(x) + d, f(bx), and f(x - c) for specific positive and negative values of a, b, c, and d;	Analyze transformations of exponential, simple radical, and rational functions * • Determine the impact on a graph by replacing F(x) by F(x+k), F(x)+k,k(f(x)) or F(x) by F(kx), and determine what values of k will result in a new graph • Use technology to represent and explain the impact of these changes on the graphs • Determine whether a function is even or odd based on its algebraic or graphical representation
9-12.4.F solve quadratic and square root equations;	Analyze, perform operations, and solve quadratic expressions and equations. * • Factor quadratic expressions. • Determine the maximum or minimum of a quadratic function by completing the square. Use inspection and completing the square to solve quadratic equations.*
9-12.4.H solve quadratic inequalities.	Represent all kinds of relationships, including simple root functions, as algebraic equations to solve mathematical and real-world problems. * • Create equations and inequalities in one variable that may include simple rational, exponential, and root functions and use them to solve problems • Create equations in two or more variables that model complex situations and graph them on the coordinate plane. • Solve systems of equations and inequalities that model complex situations, and interpret the results. • Solve literal functions that model complex situations for a specific

Grades 9 - 12 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	variable, including formulas involving simple roots.
9-12.5.B formulate exponential and logarithmic equations that model real-world situations, including exponential relationships written in recursive notation;	Demonstrate an understanding of the connection between exponential and logarithmic relationships. * • Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents. • Translate between logarithmic equations of base 2, 10 or e, and their exponential forms. • Translate between equivalent forms of logarithmic equations.
9-12.5.C rewrite exponential equations as their corresponding logarithmic equations and logarithmic equations as their corresponding exponential equations;	Demonstrate an understanding of the connection between exponential and logarithmic relationships. • Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents. • Translate between logarithmic equations of base 2, 10 or e, and their exponential forms. • Translate between equivalent forms of logarithmic equations.
9-12.6.A analyze the effect on the graphs of $f(x) = x^3$ and $f(x) = \sqrt[3]{x}$ when f(x) is replaced by af(x), f(bx), f(x - c), and f(x) + d for specific positive and negative real values of a, b, c, and d;	Analyze transformations of exponential, simple radical, and rational functions * • Determine the impact on a graph by replacing F(x) by F(x+k), F(x)+k,k(f(x)) or F(x) by F(kx), and determine what values of k will result in a new graph • Use technology to represent and explain the impact of these changes on the graphs • Determine whether a function is even or odd based on its algebraic or graphical representation

Grades 9 - 12 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
9-12.6.B solve cube root equations that have real roots;	Interpret a variety of functions, including radical, piece-wise defined, step, absolute value, polynomial (degree 3 or higher), and/or rational functions, in real-world and mathematical situations. * • For radical, piece-wise defined, step, absolute value, polynomial (degree 3 or higher), and/or rational functions, interpret models represented as graphs and tables in terms of intercepts; intervals on which the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; and end behavior. • Sketch graphs of radical, piece-wise defined, step, absolute value, polynomial (degree 3 or higher), and/or rational functions using the intercepts; intervals on which the function is increasing or decreasing; intervals on which the function is positive or negative; symmetry; end behavior; and any maximums or minimums of the graphs. • Determine an appropriate domain of a function and relate it to its graph. Use only functions that could be modeled by radical, piece-wise defined, step, absolute value, polynomial (degree 3 or higher), and/or rational functions. • Determine and interpret the average rate of change of a radical, piece-wise defined, step, absolute value, polynomial (degree 3 or higher), and/or rational function presented in an equation or table over a specified interval. • Estimate the rate of change of a radical, piece-wise defined, step, absolute value, polynomial (degree 3 or higher), and/

Grades 9 - 12 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	or rational function from a graph over a specified interval.
9-12.6.E solve absolute value linear equations;	Graphically solve systems of equations or inequalities, using linear, polynomial, rational, radical, absolute value, exponential and/or logarithmic equations or inequalities. [Systems do not include linear and linear; exponential and exponential; or linear and exponential equations. Linear and exponential are used in conjunction with one of the other types.]*
9-12.6.F solve absolute value linear inequalities;	Graphically solve systems of equations or inequalities, using linear, polynomial, rational, radical, absolute value, exponential and/or logarithmic equations or inequalities. [Systems do not include linear and linear; exponential and exponential; or linear and exponential equations. Linear and exponential are used in conjunction with one of the other types.]*
9-12.6.G analyze the effect on the graphs of f(x) = 1/x when f(x) is replaced by af(x), f(bx), f(x-c), and f(x) + d for specific positive and negative real values of a, b, c, and d;	Analyze transformations of exponential, simple radical, and rational functions * • Determine the impact on a graph by replacing F(x) by F(x+k), F(x)+k,k(f(x)) or F(x) by F(kx), and determine what values of k will result in a new graph • Use technology to represent and explain the impact of these changes on the graphs • Determine whether a function is even or odd based on its algebraic or graphical representation
9-12.6.H formulate rational equations that model real-world situations;	Interpret a variety of functions, including radical, piece-wise defined, step, absolute value, polynomial (degree 3 or higher), and/or rational functions, in real-world and mathematical situations. *

Grades 9 - 12 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	• For radical, piece-wise defined, step, absolute value, polynomial (degree 3 or higher), and/or rational functions, interpret models represented as graphs and tables in terms of intercepts; intervals on which the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; and end behavior. • Sketch graphs of radical, piece-wise defined, step, absolute value, polynomial (degree 3 or higher), and/or rational functions using the intercepts; intervals on which the function is increasing or decreasing; intervals on which the function is positive or negative; symmetry; end behavior; and any maximums or minimums of the graphs. • Determine an appropriate domain of a function and relate it to its graph. Use only functions that could be modeled by radical, piece-wise defined, step, absolute value, polynomial (degree 3 or higher), and/or rational functions. • Determine and interpret the average rate of change of a radical, piece-wise defined, step, absolute value, polynomial (degree 3 or higher), and/or rational function presented in an equation or table over a specified interval. • Estimate the rate of change of a radical, piece-wise defined, step, absolute value, polynomial (degree 3 or higher), and/or rational function from a graph over a specified interval.
9-12.6.I solve rational equations that have real solutions;	Solve simple radical and rational equations, including those with extraneous solutions and justify reasoning.*

**This skill is related to the aligned standard*

Grades 9 - 12 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
9-12.6.J determine the reasonableness of a solution to a rational equation;	Solve simple radical and rational equations, including those with extraneous solutions and justify reasoning.*
9-12.6.K determine the asymptotic restrictions on the domain of a rational function and represent domain and range using interval notation, inequalities, and set notation; and	Interpret a variety of functions, including radical, piece-wise defined, step, absolute value, polynomial (degree 3 or higher), and/or rational functions, in real-world and mathematical situations. * • For radical, piece-wise defined, step, absolute value, polynomial (degree 3 or higher), and/or rational functions, interpret models represented as graphs and tables in terms of intercepts; intervals on which the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; and end behavior. • Sketch graphs of radical, piece-wise defined, step, absolute value, polynomial (degree 3 or higher), and/or rational functions using the intercepts; intervals on which the function is increasing or decreasing; intervals on which the function is positive or negative; symmetry; end behavior; and any maximums or minimums of the graphs. • Determine an appropriate domain of a function and relate it to its graph. Use only functions that could be modeled by radical, piece-wise defined, step, absolute value, polynomial (degree 3 or higher), and/or rational functions. • Determine and interpret the average rate of change of a radical, piece-wise defined, step, absolute value, polynomial (degree 3 or higher), and/or rational function presented in an equation or table over a specified interval.

**This skill is related to the aligned standard*

Grades 9 - 12 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	• Estimate the rate of change of a radical, piece-wise defined, step, absolute value, polynomial (degree 3 or higher), and/ or rational function from a graph over a specified interval.
9-12.7.A add, subtract, and multiply complex numbers;	Demonstrate a deep understanding of complex numbers by using them in polynomial theorems and identities. * • Use complex numbers in rewriting algebraic expressions. • Determine the number of roots for a polynomial of any degree. • Prove that all quadratic polynomials have two roots.
9-12.7.B add, subtract, and multiply polynomials;	Add, subtract, and multiply polynomials. Add, subtract, and multiply polynomials of degree 3 or greater.
9-12.7.D determine the linear factors of a polynomial function of degree three and of degree four using algebraic methods;	Determine the zeros of polynomials and use them in graphing. * • Demonstrate an understanding of the Remainder and Factor theorems and use them in polynomial division problems • Find the zeros of polynomials of degree three or greater by factoring • Sketch graphs of polynomial functions using zeros
9-12.7.E determine linear and quadratic factors of a polynomial expression of degree three and of degree four, including factoring the sum and difference of two cubes and factoring by grouping;	Determine the zeros of polynomials and use them in graphing. * • Demonstrate an understanding of the Remainder and Factor theorems and use them in polynomial division problems • Find the zeros of polynomials of degree three or greater by factoring • Sketch graphs of polynomial functions using zeros

Grades 9 - 12 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
9-12.7.F determine the sum, difference, product, and quotient of rational expressions with integral exponents of degree one and of degree two;	Rewrite rational expressions with linear and quadratic denominators. * • Determine the quotient of simple rational expressions that have linear or quadratic denominators. For example, write a(x)/b(x) in the form q(x) + r(x)/b(x), where a(x), b(x), q(x), and r(x) are polynomials with the degree of r(x) less than the degree of b(x), using factoring, synthetic division, or long division • Add, subtract, multiply, and divide rational expressions with linear or quadratic denominators
9-12.7.H solve equations involving rational exponents; and	Solve simple radical and rational equations, including those with extraneous solutions and justify reasoning.*
9-12.7.I write the domain and range of a function in interval notation, inequalities, and set notation.	Interpret quadratic functions in real-world and mathematical situations. * • For quadratic functions, interpret models represented as graphs and tables in terms of the intercepts, maxima, minima, and intervals where the function is increasing and decreasing. • Sketch graphs of functions given the intercepts, intervals on which the function is increasing or decreasing, symmetry, end behavior, and a maximum or a minimum of the graph. • Determine an appropriate domain of a function for its graph, using only functions that could be modeled by quadratic functions or exponential functions with rational exponents. • Determine the average rate of change over a specified interval of a quadratic or exponential function with rational exponents using an equation or table.

Grades 9 - 12 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	• Estimate the average rate of change over a specified interval of a quadratic or exponential function with rational exponents using a graph. Interpret a variety of functions, including radical, piece-wise defined, step, absolute value, polynomial (degree 3 or higher), and/or rational functions, in real-world and mathematical situations. * • For radical, piece-wise defined, step, absolute value, polynomial (degree 3 or higher), and/or rational functions, interpret models represented as graphs and tables in terms of intercepts; intervals on which the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; and end behavior. • Sketch graphs of radical, piece-wise defined, step, absolute value, polynomial (degree 3 or higher), and/or rational functions using the intercepts; intervals on which the function is increasing or decreasing; intervals on which the function is positive or negative; symmetry; end behavior; and any maximums or minimums of the graphs. • Determine an appropriate domain of a function and relate it to its graph. Use only functions that could be modeled by radical, piece-wise defined, step, absolute value, polynomial (degree 3 or higher), and/or rational functions. • Determine and interpret the average rate of change of a radical, piece-wise defined, step, absolute value, polynomial (degree 3 or higher), and/or rational

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	function presented in an equation or table over a specified interval. • Estimate the rate of change of a radical, piece-wise defined, step, absolute value, polynomial (degree 3 or higher), and/or rational function from a graph over a specified interval. Construct new representations of a variety of functions from algebraic, graphical, numerical, or verbal representations. * • Create new functions using arithmetic operations by combining standard functions, such as linear functions, exponential functions, quadratic functions, square and cube root functions, polynomial functions, rational functions, logarithmic functions, absolute value functions, piece-wise defined functions, step functions, etc. • Demonstrate an understanding of composition of functions; state the domain and range for newly composed functions and represent functions that are compositions of functions algebraically.
9-12.8.A analyze data to select the appropriate model from among linear . . . and exponential models;	Analyze data on a scatter plot and determine a good model. • Determine if a linear or exponential model is a good fit from a scatterplot of the data. • Determine a linear function that best fits data in a scatterplot that suggests a linear model or an exponential function that best fits data in a scatterplot that suggests an exponential model, and use the functions to estimate future trends. • Determine from a plot of the residuals of a scatterplot whether a linear model or

Grades 9 - 12 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	exponential model is a good fit for the data.
9-12.8.B use regression methods . . . to write a linear function . . . [or] an exponential function from a given set of data; and	Analyze data on a scatter plot and determine a good model. • Determine if a linear or exponential model is a good fit from a scatterplot of the data. • Determine a linear function that best fits data in a scatterplot that suggests a linear model or an exponential function that best fits data in a scatterplot that suggests an exponential model, and use the functions to estimate future trends. • Determine from a plot of the residuals of a scatterplot whether a linear model or exponential model is a good fit for the data.
9-12.2.B derive and use the distance, slope, and midpoint formulas to verify geometric relationships, including congruence of segments and parallelism or perpendicularity of pairs of lines; and	Use coordinate geometry to prove geometric theorems and to solve real-world and mathematical problems.* • Prove simple geometric theorems using the rectangular coordinate system. • Prove that lines with the same slope are either the same line or parallel lines; Prove that lines are perpendicular if and only if the slopes have a product of -1. Find the equation of a line parallel or perpendicular to a given line through a specified point. • Find the perimeters of polygons and areas of triangles and rectangles using the rectangular coordinate system.
9-12.2.C determine an equation of a line parallel or perpendicular to a given line that passes through a given point.	Use coordinate geometry to prove geometric theorems and to solve real-world and mathematical problems.* • Prove simple geometric theorems using the rectangular coordinate system.

Grades 9 - 12 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	• Prove that lines with the same slope are either the same line or parallel lines; Prove that lines are perpendicular if and only if the slopes have a product of -1. Find the equation of a line parallel or perpendicular to a given line through a specified point. • Find the perimeters of polygons and areas of triangles and rectangles using the rectangular coordinate system.
9-12.3.A describe and perform transformations of figures in a plane using coordinate notation;	Demonstrate a fundamental understanding of congruence as it relates to transformations of rigid motions, including those involving triangles.* • Describe translations, rotations, and reflections using geometric terms, and predict the impact of these transformations on figures. Use the definition of congruence in terms of rigid motions to decide if two figures are congruent. • Show that two triangles are congruent if and only if the corresponding sides and angles are congruent using the definition of congruence in terms of rigid motions. • Using congruence in terms of rigid motions, show how the congruence criteria for triangles (ASA, SAS, and SSS) follows.
9-12.3.A describe and perform transformations [dilations] of figures in a plane using coordinate[s] . . .	Demonstrate an understanding of similarity in terms of transformations. • Show that a dilation takes a line not passing through the center of the dilation to a parallel line. • Show that a dilation leaves a line passing through the center of the dilation unchanged.

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	• Show that the dilation of a line segment creates a new line segment in the ratio of the scale factor of the dilation. • Represent the image of a given non-rigid motion transformation, given the pre-image and the horizontal/vertical stretch or dilation. Determine a sequence of transformations with a stretch or dilation that will carry the pre-image of a figure onto its image. • Show that transformations will result in similar figures by preserving the measure of corresponding angles and creating corresponding sides with proportional lengths. • Associate a rule describing a non-rigid motion transformation with a horizontal/vertical stretch or a dilation centered at the origin. • Prove the AA criterion for similarity using transformations.
9-12.3.A describe and perform [rigid] transformations of figures in a plane using coordinate notation;	Represent, describe, and model transformations in the plane. • Represent and describe transformations in the plane as functions. Contrast transformations that are rigid motions to transformations that contain dilations. • Associate a rule with a rigid motion transformation. • Identify and describe transformations that carry quadrilaterals and regular polygons onto themselves. • Develop definitions of the rigid motion transformations using the geometric terms of parallel lines, perpendicular lines, angles, and circles. • Represent the image of a given rigid motion transformation given the pre-image and the specific rotation,

Grades 9 - 12 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	translation, or reflection. Determine what sequence of rigid transformations will carry the pre-image of a figure onto its image.
9-12.3.B determine the image . . . of a given two-dimensional figure under . . . dilations . . . in the plane;	Demonstrate an understanding of similarity in terms of transformations. • Show that a dilation takes a line not passing through the center of the dilation to a parallel line. • Show that a dilation leaves a line passing through the center of the dilation unchanged. • Show that the dilation of a line segment creates a new line segment in the ratio of the scale factor of the dilation. • Represent the image of a given non-rigid motion transformation, given the pre-image and the horizontal/vertical stretch or dilation. Determine a sequence of transformations with a stretch or dilation that will carry the pre-image of a figure onto its image. • Show that transformations will result in similar figures by preserving the measure of corresponding angles and creating corresponding sides with proportional lengths. • Associate a rule describing a non-rigid motion transformation with a horizontal/vertical stretch or a dilation centered at the origin. • Prove the AA criterion for similarity using transformations.
9-12.3.B determine the image . . . of a given two-dimensional figure under . . . rigid transformations . . .	Represent, describe, and model transformations in the plane. • Represent and describe transformations in the plane as functions. Contrast transformations that are rigid motions to transformations that contain dilations.

Grades 9 - 12 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	• Associate a rule with a rigid motion transformation. • Identify and describe transformations that carry quadrilaterals and regular polygons onto themselves. • Develop definitions of the rigid motion transformations using the geometric terms of parallel lines, perpendicular lines, angles, and circles. • Represent the image of a given rigid motion transformation given the pre-image and the specific rotation, translation, or reflection. Determine what sequence of rigid transformations will carry the pre-image of a figure onto its image.
9-12.3.B determine the image or pre-image of a given two-dimensional figure under a composition of rigid transformations, a composition of non-rigid transformations, and a composition of both, including dilations where the center can be any point in the plane;	Demonstrate a fundamental understanding of congruence as it relates to transformations of rigid motions, including those involving triangles.* • Describe translations, rotations, and reflections using geometric terms, and predict the impact of these transformations on figures. Use the definition of congruence in terms of rigid motions to decide if two figures are congruent. • Show that two triangles are congruent if and only if the corresponding sides and angles are congruent using the definition of congruence in terms of rigid motions. • Using congruence in terms of rigid motions, show how the congruence criteria for triangles (ASA, SAS, and SSS) follows.
9-12.3.C identify the sequence of transformations that will carry a given pre-image onto an image on and off the coordinate plane; and	Demonstrate a fundamental understanding of congruence as it relates to transformations of rigid motions, including those involving triangles.*

Grades 9 - 12 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	• Describe translations, rotations, and reflections using geometric terms, and predict the impact of these transformations on figures. Use the definition of congruence in terms of rigid motions to decide if two figures are congruent. • Show that two triangles are congruent if and only if the corresponding sides and angles are congruent using the definition of congruence in terms of rigid motions. • Using congruence in terms of rigid motions, show how the congruence criteria for triangles (ASA, SAS, and SSS) follows.
9-12.3.C identify the sequence of transformations [with a dilation] that will carry a given pre-image onto an image on . . . the coordinate plane; and	Demonstrate an understanding of similarity in terms of transformations. • Show that a dilation takes a line not passing through the center of the dilation to a parallel line. • Show that a dilation leaves a line passing through the center of the dilation unchanged. • Show that the dilation of a line segment creates a new line segment in the ratio of the scale factor of the dilation. • Represent the image of a given non-rigid motion transformation, given the pre-image and the horizontal/vertical stretch or dilation. Determine a sequence of transformations with a stretch or dilation that will carry the pre-image of a figure onto its image. • Show that transformations will result in similar figures by preserving the measure of corresponding angles and creating corresponding sides with proportional lengths.

Grades 9 - 12 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	• Associate a rule describing a non-rigid motion transformation with a horizontal/ vertical stretch or a dilation centered at the origin. • Prove the AA criterion for similarity using transformations.
9-12.3.C identify the sequence of [rigid] transformations that will carry a given pre-image onto an image on . . . the coordinate plane; and	Represent, describe, and model transformations in the plane. • Represent and describe transformations in the plane as functions. Contrast transformations that are rigid motions to transformations that contain dilations. • Associate a rule with a rigid motion transformation. • Identify and describe transformations that carry quadrilaterals and regular polygons onto themselves. • Develop definitions of the rigid motion transformations using the geometric terms of parallel lines, perpendicular lines, angles, and circles. • Represent the image of a given rigid motion transformation given the pre-image and the specific rotation, translation, or reflection. Determine what sequence of rigid transformations will carry the pre-image of a figure onto its image.
9-12.5.A investigate patterns to make conjectures about geometric relationships, including angles formed by parallel lines cut by a transversal, criteria required for triangle congruence, special segments of triangles, diagonals of quadrilaterals, interior and exterior angles of polygons, and special segments and angles of circles choosing from a variety of tools;	Prove simple theorems about lines and angles.* • Prove vertical angles are congruent. • Prove that when a transversal crosses parallel lines, alternate interior angles are congruent. • Prove that when a transversal crosses parallel lines, corresponding angles are congruent.

Grades 9 - 12 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	• Prove that any point on a perpendicular bisector of a line segment is equidistant from the line segment's endpoints.
9-12.5.B construct congruent segments, congruent angles, a segment bisector, an angle bisector, perpendicular lines, the perpendicular bisector of a line segment, and a line parallel to a given line through a point not on a line using a compass and a straightedge;	Identify the steps in the process of more advanced geometric constructions, including the following, and explain the steps in the process.* • Construction of an equilateral triangle • Construction of a square • Construction of a regular hexagon inscribed in a circle.
9-12.6.A verify theorems about angles formed by the intersection of lines and line segments, including vertical angles, and angles formed by parallel lines cut by a transversal and prove equidistance between the endpoints of a segment and points on its perpendicular bisector and apply these relationships to solve problems;	Prove simple theorems about lines and angles.* • Prove vertical angles are congruent. • Prove that when a transversal crosses parallel lines, alternate interior angles are congruent. • Prove that when a transversal crosses parallel lines, corresponding angles are congruent. • Prove that any point on a perpendicular bisector of a line segment is equidistant from the line segment's endpoints.
9-12.6.B . . . [Explain] the Side-Angle-Side, Angle-Side-Angle, [and] Side-Side-Side . . . congruence conditions;	Represent, describe, and model transformations in the plane. • Represent and describe transformations in the plane as functions. Contrast transformations that are rigid motions to transformations that contain dilations. • Associate a rule with a rigid motion transformation. • Identify and describe transformations that carry quadrilaterals and regular polygons onto themselves. • Develop definitions of the rigid motion transformations using the geometric terms of parallel lines, perpendicular lines, angles, and circles.

**This skill is related to the aligned standard*

Grades 9 - 12 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	• Represent the image of a given rigid motion transformation given the pre-image and the specific rotation, translation, or reflection. Determine what sequence of rigid transformations will carry the pre-image of a figure onto its image.
9-12.6.B prove two triangles are congruent by applying the Side-Angle-Side, Angle-Side-Angle, Side-Side-Side, Angle-Angle-Side, and Hypotenuse-Leg congruence conditions;	Demonstrate a fundamental understanding of congruence as it relates to transformations of rigid motions, including those involving triangles.* • Describe translations, rotations, and reflections using geometric terms, and predict the impact of these transformations on figures. Use the definition of congruence in terms of rigid motions to decide if two figures are congruent. • Show that two triangles are congruent if and only if the corresponding sides and angles are congruent using the definition of congruence in terms of rigid motions. • Using congruence in terms of rigid motions, show how the congruence criteria for triangles (ASA, SAS, and SSS) follows. Solve problems and prove relationships about triangles using congruence and similarity.* • Solve problems using congruence criteria for triangles. • Solve problems using similarity criteria for triangles. • Prove that a line parallel to one side of a triangle divides the other two proportionally and the converse. • Prove the Pythagorean Theorem using similar triangles.

**This skill is related to the aligned standard*

Grades 9 - 12 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
9-12.6.C apply the definition of congruence, in terms of rigid transformations, to identify congruent figures and their corresponding sides and angles;	Represent, describe, and model transformations in the plane. • Represent and describe transformations in the plane as functions. Contrast transformations that are rigid motions to transformations that contain dilations. • Associate a rule with a rigid motion transformation. • Identify and describe transformations that carry quadrilaterals and regular polygons onto themselves. • Develop definitions of the rigid motion transformations using the geometric terms of parallel lines, perpendicular lines, angles, and circles. • Represent the image of a given rigid motion transformation given the pre-image and the specific rotation, translation, or reflection. Determine what sequence of rigid transformations will carry the pre-image of a figure onto its image. Demonstrate a fundamental understanding of congruence as it relates to transformations of rigid motions, including those involving triangles.* • Describe translations, rotations, and reflections using geometric terms, and predict the impact of these transformations on figures. Use the definition of congruence in terms of rigid motions to decide if two figures are congruent. • Show that two triangles are congruent if and only if the corresponding sides and angles are congruent using the definition of congruence in terms of rigid motions.

**This skill is related to the aligned standard*

Grades 9 - 12 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	• Using congruence in terms of rigid motions, show how the congruence criteria for triangles (ASA, SAS, and SSS) follows.
9-12.6.D verify theorems about the relationships in triangles, including proof of the Pythagorean Theorem, the sum of interior angles, base angles of isosceles triangles, midsegments, and medians, and apply these relationships to solve problems; and	Use coordinate geometry to prove geometric theorems and to solve real-world and mathematical problems.* • Prove simple geometric theorems using the rectangular coordinate system. • Prove that lines with the same slope are either the same line or parallel lines; Prove that lines are perpendicular if and only if the slopes have a product of -1. Find the equation of a line parallel or perpendicular to a given line through a specified point. • Find the perimeters of polygons and areas of triangles and rectangles using the rectangular coordinate system. Prove simple theorems about lines and angles.* • Prove vertical angles are congruent. • Prove that when a transversal crosses parallel lines, alternate interior angles are congruent. • Prove that when a transversal crosses parallel lines, corresponding angles are congruent. • Prove that any point on a perpendicular bisector of a line segment is equidistant from the line segment's endpoints. Prove simple theorems about triangles and parallelograms in the Euclidean plane* • Prove the measures of interior angles of a triangle sum to 180°. • Prove the base angles of isosceles triangles are congruent.

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	• Prove the segment joining midpoints of two sides of a triangle is parallel to the third side. • Prove the segment joining midpoints of two sides of a triangle is half the length of the third side. • Prove the medians of a triangle meet at a point. • Prove opposite sides of a parallelogram are congruent. • Prove opposite angles of a parallelogram are congruent. • Prove the diagonals of a parallelogram bisect each other. • Prove that parallelograms with congruent diagonals are rectangles.
9-12.7.A apply the definition of similarity in terms of a dilation to identify similar figures and their proportional sides and the congruent corresponding angles; and	Demonstrate an understanding of similarity in terms of transformations. • Show that a dilation takes a line not passing through the center of the dilation to a parallel line. • Show that a dilation leaves a line passing through the center of the dilation unchanged. • Show that the dilation of a line segment creates a new line segment in the ratio of the scale factor of the dilation. • Represent the image of a given non-rigid motion transformation, given the pre-image and the horizontal/vertical stretch or dilation. Determine a sequence of transformations with a stretch or dilation that will carry the pre-image of a figure onto its image. • Show that transformations will result in similar figures by preserving the measure of corresponding angles and creating corresponding sides with proportional lengths.

Grades 9 - 12 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	• Associate a rule describing a non-rigid motion transformation with a horizontal/ vertical stretch or a dilation centered at the origin. • Prove the AA criterion for similarity using transformations.
9-12.7.B apply the Angle-Angle criterion to verify similar triangles and apply the proportionality of the corresponding sides . . .	Demonstrate an understanding of similarity in terms of transformations. • Show that a dilation takes a line not passing through the center of the dilation to a parallel line. • Show that a dilation leaves a line passing through the center of the dilation unchanged. • Show that the dilation of a line segment creates a new line segment in the ratio of the scale factor of the dilation. • Represent the image of a given non-rigid motion transformation, given the pre-image and the horizontal/vertical stretch or dilation. Determine a sequence of transformations with a stretch or dilation that will carry the pre-image of a figure onto its image. • Show that transformations will result in similar figures by preserving the measure of corresponding angles and creating corresponding sides with proportional lengths. • Associate a rule describing a non-rigid motion transformation with a horizontal/ vertical stretch or a dilation centered at the origin. • Prove the AA criterion for similarity using transformations.
9-12.8.A prove theorems about similar triangles, . . . and apply these theorems . . .	Demonstrate an understanding of similarity in terms of transformations.

Grades 9 - 12 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	• Show that a dilation takes a line not passing through the center of the dilation to a parallel line. • Show that a dilation leaves a line passing through the center of the dilation unchanged. • Show that the dilation of a line segment creates a new line segment in the ratio of the scale factor of the dilation. • Represent the image of a given non-rigid motion transformation, given the pre-image and the horizontal/vertical stretch or dilation. Determine a sequence of transformations with a stretch or dilation that will carry the pre-image of a figure onto its image. • Show that transformations will result in similar figures by preserving the measure of corresponding angles and creating corresponding sides with proportional lengths. • Associate a rule describing a non-rigid motion transformation with a horizontal/vertical stretch or a dilation centered at the origin. • Prove the AA criterion for similarity using transformations.
9-12.8.A prove theorems about similar triangles, including the Triangle Proportionality theorem, and apply these theorems to solve problems; and	Solve problems and prove relationships about triangles using congruence and similarity.* • Solve problems using congruence criteria for triangles. • Solve problems using similarity criteria for triangles. • Prove that a line parallel to one side of a triangle divides the other two proportionally and the converse. • Prove the Pythagorean Theorem using similar triangles.

Grades 9 - 12 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	Demonstrate an understanding of trigonometric ratios and use them to solve real-world and mathematical problems.* • Understand that sine, cosine, and tangent are ratios of sides in a right triangle and the ratios remain constant for each angle measure. • Demonstrate that sin x = cos (90-x), and use this fact to solve problems in right triangles. • Use first quadrant sine, cosine, and tangent ratios along with the Pythagorean Theorem to solve real world problems.
9-12.9.B apply the relationships in special right triangles 30°-60°-90° and 45°-45°-90° and the Pythagorean theorem, including Pythagorean triples, to solve problems.	Use the Pythagorean theorem to solve problems involving right triangles.*
9-12.11.D apply the formulas for the volume of three-dimensional figures, including prisms, pyramids, cones, cylinders, spheres, and composite figures, to solve problems using appropriate units of measure.	Demonstrate an understanding of volume formulas and use them to solve problems involving • Cylinders • Cones • Spheres • Pyramids
9-12.12.A apply theorems about circles, including relationships among angles, radii, chords, tangents, and secants, to solve non-contextual problems;	Demonstrate an understanding of the similarity of circles and describe relationships of segments in circles and use them to solve problems.* • Use transformations to prove that any two circles are similar. • Identify and describe relationships among angles, chords, and tangents; including central, inscribed, and circumscribed angles. • Recognize that an inscribed angle on a diameter is right.

Grades 9 - 12 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	• Recognize that the radius of a circle is perpendicular to a tangent of the circle where the radius intersects the circle. • Recognize and prove that the opposite angles of a quadrilateral inscribed in a circle are supplementary. • Construct an inscribed or circumscribed circle of a triangle, using a virtual compass and straight edge.
9-12.12.B apply the proportional relationship between the measure of an arc length of a circle and the circumference of the circle to solve problems;	Demonstrate an understanding of the properties of a sector of a circle and apply them to solve problems.* • Convert between radian measure and angle measure. • Recognize and show that #r is the length of the arc intercepted by an angle. • Recognize and show that (#r^2)/2 is the formula for the area of a sector of a circle.
9-12.12.C apply the proportional relationship between the measure of the area of a sector of a circle and the area of the circle to solve problems;	Demonstrate an understanding of the properties of a sector of a circle and apply them to solve problems.* • Convert between radian measure and angle measure. • Recognize and show that #r is the length of the arc intercepted by an angle. • Recognize and show that (#r^2)/2 is the formula for the area of a sector of a circle.
9-12.12.D describe radian measure of an angle as the ratio of the length of an arc intercepted by a central angle and the radius of the circle; and	Demonstrate an understanding of the properties of a sector of a circle and apply them to solve problems.* • Convert between radian measure and angle measure. • Recognize and show that #r is the length of the arc intercepted by an angle.

Grades 9 - 12 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	• Recognize and show that (#r^2)/2 is the formula for the area of a sector of a circle.
9-12.12.E show that the equation of a circle with center at the origin and radius r is $x^2 + y^2 = r^2$ and determine the equation for the graph of a circle with radius r and center (h, k), $(x - h)^2 + (y - k)^2 = r^2$.	Derive equations of simple conic sections: parabolas and circles.* • Use the Pythagorean theorem to derive the equation of a circle. • Find the center and radius of a circle given by completing the square. • Given the focus and directrix, derive the equation of a parabola.
9-12.13.C identify whether two events are independent and compute the probability of the two events occurring together with or without replacement;	Demonstrate an understanding of sample spaces and independent events.* • Use set notation and set vocabulary, such as union, intersection, and complement to describe sample spaces. • Identify independent events A and B as events such that the probability of A and B occurring is determined by multiplying the Probability of A by the Probability of B.
9-12.13.D apply conditional probability in contextual problems; and	Demonstrate an understanding of conditional probability and use conditional probability in real-world situations.* • Determine the conditional probability of A given B when A and B are dependent events. Identify that A and B are independent events if P(B) is not conditional upon the occurrence of A. • Represent bivariate data in two-way frequency tables and interpret the relative frequencies to determine conditional probabilities and whether events are independent or not. • Relate real world situations to conceptual understandings of conditional probability and independence.

Grades 9 - 12 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	Use introductory probability techniques and counting rules to evaluate outcomes and determine probabilities.* • Use the formula P(B|A) = P(AnB)/P(A) to determine the conditional probability of A given B and interpret the answers in real world situations. • Use the Addition Rule for dependent and independent events, and interpret the answers in real world situations.
9-12.13.E apply independence in contextual problems.	Demonstrate an understanding of sample spaces and independent events.* • Use set notation and set vocabulary, such as union, intersection, and complement to describe sample spaces. • Identify independent events A and B as events such that the probability of A and B occurring is determined by multiplying the Probability of A by the Probability of B.
9-12.2.A use the composition of two functions to . . . solve . . . problems;	Construct new representations of a variety of functions from algebraic, graphical, numerical, or verbal representations. • Create new functions using arithmetic operations by combining standard functions, such as linear functions, exponential functions, quadratic functions, square and cube root functions, polynomial functions, rational functions, logarithmic functions, absolute value functions, piece-wise defined functions, step functions, etc. • Demonstrate an understanding of composition of functions; state the domain and range for newly composed functions and represent functions that are compositions of functions algebraically.

**This skill is related to the aligned standard*

Grades 9 - 12 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
9-12.2.B demonstrate that function composition is not always commutative;	Construct new representations of a variety of functions from algebraic, graphical, numerical, or verbal representations. * • Create new functions using arithmetic operations by combining standard functions, such as linear functions, exponential functions, quadratic functions, square and cube root functions, polynomial functions, rational functions, logarithmic functions, absolute value functions, piece-wise defined functions, step functions, etc. • Demonstrate an understanding of composition of functions; state the domain and range for newly composed functions and represent functions that are compositions of functions algebraically.
9-12.2.C represent a given function as a composite function of two or more functions;	Construct new representations of a variety of functions from algebraic, graphical, numerical, or verbal representations. * • Create new functions using arithmetic operations by combining standard functions, such as linear functions, exponential functions, quadratic functions, square and cube root functions, polynomial functions, rational functions, logarithmic functions, absolute value functions, piece-wise defined functions, step functions, etc. • Demonstrate an understanding of composition of functions; state the domain and range for newly composed functions and represent functions that are compositions of functions algebraically.
9-12.2.D describe symmetry of graphs of even and odd functions;	Interpret a variety of functions, including radical, piece-wise defined, step, absolute

Grades 9 - 12 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	value, polynomial (degree 3 or higher), and/or rational functions, in real-world and mathematical situations. * • For radical, piece-wise defined, step, absolute value, polynomial (degree 3 or higher), and/or rational functions, interpret models represented as graphs and tables in terms of intercepts; intervals on which the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; and end behavior. • Sketch graphs of radical, piece-wise defined, step, absolute value, polynomial (degree 3 or higher), and/or rational functions using the intercepts; intervals on which the function is increasing or decreasing; intervals on which the function is positive or negative; symmetry; end behavior; and any maximums or minimums of the graphs. • Determine an appropriate domain of a function and relate it to its graph. Use only functions that could be modeled by radical, piece-wise defined, step, absolute value, polynomial (degree 3 or higher), and/or rational functions. • Determine and interpret the average rate of change of a radical, piece-wise defined, step, absolute value, polynomial (degree 3 or higher), and/or rational function presented in an equation or table over a specified interval. • Estimate the rate of change of a radical, piece-wise defined, step, absolute value, polynomial (degree 3 or higher), and/or rational function from a graph over a specified interval.

Grades 9 - 12 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
9-12.2.E determine an inverse function, when it exists, for a given [exponential, radical, absolute value, polynomial (degree 3 or greater), rational or logarithmic] function . . . and represent the inverse . . .	Determine whether an exponential, simple radical, absolute value, polynomial (degree 3 or greater), rational, or logarithmic function has an inverse that is also a function, and if so, write an expression or equation for the inverse.
9-12.2.E determine an inverse function, when it exists, for a given [linear or quadratic] function . . . and represent the inverse . . .	Determine whether a linear or quadratic function has an inverse that is also a function, and if so, write the inverse function.
9-12.2.F graph exponential, logarithmic, rational, polynomial, . . . trigonometric, . . . and piecewise defined functions, including step functions;	Graph square root, cube root, piece-wise-defined, step-, absolute-value, logarithmic, trigonometric, and rational functions. • Graph a variety of functions including square root, cube root, piece-wise-defined, step, and absolute value functions. • Graph polynomial functions of degree 3 or greater; identify the intercepts and describe end-behavior. • Graph logarithmic functions; identify and interpret intercepts, asymptotes, and end-behavior. • Graph trigonometric functions; identify and interpret midline, periodicity, amplitude, phase shift, and intercepts. • Determine an appropriate domain and range of a logarithmic or trigonometric function and relate them to its graph. • Graph rational functions; identify points of discontinuity, asymptotes, and end-behavior.
9-12.2.F graph exponential, logarithmic, rational, [and] polynomial . . . functions . . .	Graphically solve systems of equations or inequalities, using linear, polynomial, rational, radical, absolute value, exponential and/or logarithmic equations or inequalities. [Systems do not include linear and linear; exponential and exponential; or linear

Grades 9 - 12 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	and exponential equations. Linear and exponential are used in conjunction with one of the other types.]
9-12.2.G graph functions, including exponential, logarithmic, . . . rational, [and] polynomial . . . functions . . .	Graphically solve systems of equations or inequalities, using linear, polynomial, rational, radical, absolute value, exponential and/or logarithmic equations or inequalities. [Systems do not include linear and linear; exponential and exponential; or linear and exponential equations. Linear and exponential are used in conjunction with one of the other types.]
9-12.2.G graph functions, including exponential, logarithmic, sine, cosine, rational, [and] polynomial . . . functions . . .	Graph square root, cube root, piece-wise-defined, step-, absolute-value, logarithmic, trigonometric, and rational functions. • Graph a variety of functions including square root, cube root, piece-wise-defined, step, and absolute value functions. • Graph polynomial functions of degree 3 or greater; identify the intercepts and describe end-behavior. • Graph logarithmic functions; identify and interpret intercepts, asymptotes, and end-behavior. • Graph trigonometric functions; identify and interpret midline, periodicity, amplitude, phase shift, and intercepts. • Determine an appropriate domain and range of a logarithmic or trigonometric function and relate them to its graph. • Graph rational functions; identify points of discontinuity, asymptotes, and end-behavior.
9-12.2.I determine and analyze the key features of exponential, logarithmic, rational, polynomial, power, trigonometric, inverse trigonometric, and piecewise	Interpret a variety of functions, including radical, piece-wise defined, step, absolute value, polynomial (degree 3 or higher),

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
defined functions, including step functions such as domain, range, symmetry, relative maximum, relative minimum, zeros, asymptotes, and intervals over which the function is increasing or decreasing;	and/or rational functions, in real-world and mathematical situations. * • For radical, piece-wise defined, step, absolute value, polynomial (degree 3 or higher), and/or rational functions, interpret models represented as graphs and tables in terms of intercepts; intervals on which the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; and end behavior. • Sketch graphs of radical, piece-wise defined, step, absolute value, polynomial (degree 3 or higher), and/or rational functions using the intercepts; intervals on which the function is increasing or decreasing; intervals on which the function is positive or negative; symmetry; end behavior; and any maximums or minimums of the graphs. • Determine an appropriate domain of a function and relate it to its graph. Use only functions that could be modeled by radical, piece-wise defined, step, absolute value, polynomial (degree 3 or higher), and/or rational functions. • Determine and interpret the average rate of change of a radical, piece-wise defined, step, absolute value, polynomial (degree 3 or higher), and/or rational function presented in an equation or table over a specified interval. • Estimate the rate of change of a radical, piece-wise defined, step, absolute value, polynomial (degree 3 or higher), and/or rational function from a graph over a specified interval.

Grades 9 - 12 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
9-12.2.J analyze and describe end behavior of functions, including exponential, logarithmic, rational, polynomial, and power functions, using infinity notation to communicate this characteristic in mathematical and real-world problems;	Interpret a variety of functions, including radical, piece-wise defined, step, absolute value, polynomial (degree 3 or higher), and/or rational functions, in real-world and mathematical situations. * • For radical, piece-wise defined, step, absolute value, polynomial (degree 3 or higher), and/or rational functions, interpret models represented as graphs and tables in terms of intercepts; intervals on which the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; and end behavior. • Sketch graphs of radical, piece-wise defined, step, absolute value, polynomial (degree 3 or higher), and/or rational functions using the intercepts; intervals on which the function is increasing or decreasing; intervals on which the function is positive or negative; symmetry; end behavior; and any maximums or minimums of the graphs. • Determine an appropriate domain of a function and relate it to its graph. Use only functions that could be modeled by radical, piece-wise defined, step, absolute value, polynomial (degree 3 or higher), and/or rational functions. • Determine and interpret the average rate of change of a radical, piece-wise defined, step, absolute value, polynomial (degree 3 or higher), and/or rational function presented in an equation or table over a specified interval. • Estimate the rate of change of a radical, piece-wise defined, step, absolute value, polynomial (degree 3 or higher), and/

Grades 9 - 12 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	or rational function from a graph over a specified interval.
9-12.2.K analyze characteristics of rational functions and the behavior of the function around the asymptotes, including horizontal, vertical, and oblique asymptotes;	Interpret a variety of functions, including radical, piece-wise defined, step, absolute value, polynomial (degree 3 or higher), and/or rational functions, in real-world and mathematical situations. * • For radical, piece-wise defined, step, absolute value, polynomial (degree 3 or higher), and/or rational functions, interpret models represented as graphs and tables in terms of intercepts; intervals on which the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; and end behavior. • Sketch graphs of radical, piece-wise defined, step, absolute value, polynomial (degree 3 or higher), and/or rational functions using the intercepts; intervals on which the function is increasing or decreasing; intervals on which the function is positive or negative; symmetry; end behavior; and any maximums or minimums of the graphs. • Determine an appropriate domain of a function and relate it to its graph. Use only functions that could be modeled by radical, piece-wise defined, step, absolute value, polynomial (degree 3 or higher), and/or rational functions. • Determine and interpret the average rate of change of a radical, piece-wise defined, step, absolute value, polynomial (degree 3 or higher), and/or rational function presented in an equation or table over a specified interval.

Grades 9 - 12 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	• Estimate the rate of change of a radical, piece-wise defined, step, absolute value, polynomial (degree 3 or higher), and/ or rational function from a graph over a specified interval.
9-12.2.P determine the values of the trigonometric functions at the special angles and relate them in mathematical and real-world problems.	Use trigonometric functions to model periodic situations given the amplitude, frequency and midline* Demonstrate an understanding of trigonometric ratios and use them to solve real-world and mathematical problems.* • Understand that sine, cosine, and tangent are ratios of sides in a right triangle and the ratios remain constant for each angle measure. • Demonstrate that sin x = cos (90-x), and use this fact to solve problems in right triangles. • Use first quadrant sine, cosine, and tangent ratios along with the Pythagorean Theorem to solve real world problems.
9-12.4.A determine the relationship between the unit circle and the definition of a periodic function to evaluate trigonometric functions in mathematical and real-world problems;	Demonstrate an understanding of the unit circle and how it relates to trigonometric functions. * • Demonstrate a conceptual understanding of radian measure as arc length • Demonstrate a conceptual understanding between angle measures represented in degrees or radians in all four quadrants of the unit circle
9-12.4.B describe the relationship between degree and radian measure on the unit circle;	Demonstrate an understanding of the unit circle and how it relates to trigonometric functions. * • Demonstrate a conceptual understanding of radian measure as arc length

Grades 9 - 12 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	• Demonstrate a conceptual understanding between angle measures represented in degrees or radians in all four quadrants of the unit circle
9-12.4.I use vectors to model situations involving magnitude and direction;	Demonstrate an understanding of vectors and apply them to solve problems. * • Demonstrate an understanding that vectors are made up of magnitude and direction, represent vectors in the coordinate plane, and use vector notation • Determine the components of a vector • Solve real world problems involving vectors
9-12.4.K apply vector addition and multiplication of a vector by a scalar in mathematical and real-world problems.	Use algebraic and geometric representations of vectors to add and subtract vectors. * • Add vectors and demonstrate an understanding that when vectors are added, the magnitude of the resulting vector is not necessarily the sum of the magnitudes of the two original vectors • Determine the magnitude and direction of the sum of two vectors • Demonstrate an understanding of vector subtraction where **-w** is the additive inverse of **w**, and represent vector subtraction in the plane Demonstrate an understanding of scalar multiplication of vectors by representing the product graphically and by computing magnitude and direction of vectors multiplied by scalars. * • Represent scalar multiplication of vectors in the plane. Perform scalar multiplication on vectors • Determine the magnitude of a vector that is a result of scalar multiplication.

Grades 9 - 12 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	• Determine the direction of a vector that is a result of scalar multiplication
9-12.5.A evaluate finite sums and geometric series . . .	Understand the formula Sn=a(1-r^n)/(1-r) for the sum of a finite geometric series (when the common ratio is not 1) and solve problems involving finite geometric series.
9-12.5.B represent arithmetic sequences and geometric sequences using recursive formulas;	Understand the formula Sn=a(1-r^n)/(1-r) for the sum of a finite geometric series (when the common ratio is not 1) and solve problems involving finite geometric series.*
9-12.5.D represent arithmetic series and geometric series using sigma notation;	Understand the formula Sn=a(1-r^n)/(1-r) for the sum of a finite geometric series (when the common ratio is not 1) and solve problems involving finite geometric series.*
9-12.5.E calculate . . . the nth partial sum of a geometric series . . .	Understand the formula Sn=a(1-r^n)/(1-r) for the sum of a finite geometric series (when the common ratio is not 1) and solve problems involving finite geometric series.
9-12.5.F apply the Binomial Theorem for the expansion of (a + b)# in powers of a and b for a positive integer n, where a and b are any numbers;	Apply Polynomial Identities in proofs and applications. * • Use algebraic properties to demonstrate the validity of polynomial identities and apply them to mathematical and real world situations. • Demonstrate an understanding of the Binomial theorem and apply it in mathematical and real world situations.
9-12.5.G use the properties of logarithms to evaluate or transform logarithmic expressions;	Demonstrate an understanding of the connection between exponential and logarithmic relationships. • Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents. • Translate between logarithmic equations of base 2, 10 or e, and their exponential forms.

Grades 9 - 12 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	• Translate between equivalent forms of logarithmic equations.
9-12.5.H generate and solve logarithmic equations in mathematical and real-world problems;	Demonstrate an understanding of the connection between exponential and logarithmic relationships. * • Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents. • Translate between logarithmic equations of base 2, 10 or e, and their exponential forms. • Translate between equivalent forms of logarithmic equations.
9-12.5.I generate and solve exponential equations in mathematical and real-world problems;	Demonstrate an understanding of the connection between exponential and logarithmic relationships. * • Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents. • Translate between logarithmic equations of base 2, 10 or e, and their exponential forms. • Translate between equivalent forms of logarithmic equations.
9-12.9.F use regression methods . . . to model linear and exponential functions . . . and make predictions.	Analyze data on a scatter plot and determine a good model. • Determine if a linear or exponential model is a good fit from a scatterplot of the data. • Determine a linear function that best fits data in a scatterplot that suggests a linear model or an exponential function that best fits data in a scatterplot that suggests an exponential model, and use the functions to estimate future trends.

**This skill is related to the aligned standard*

Grades 9 - 12 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
	• Determine from a plot of the residuals of a scatterplot whether a linear model or exponential model is a good fit for the data.
9-12.2.A use precision and accuracy in real-life situations related to measurement and significant figures;	Determine and apply appropriate quantities to solve problems. * • Determine the quantities to be used to model real world situations and use them to solve problems. • Determine the appropriate level of accuracy in reporting quantities.
9-12.2.D solve geometric problems involving indirect measurement, including similar triangles, the Pythagorean Theorem, Law of Sines, Law of Cosines, and the use of dynamic geometry software;	Solve problems and prove relationships about triangles using congruence and similarity.* • Solve problems using congruence criteria for triangles. • Solve problems using similarity criteria for triangles. • Prove that a line parallel to one side of a triangle divides the other two proportionally and the converse. • Prove the Pythagorean Theorem using similar triangles. Demonstrate an understanding of trigonometric ratios and use them to solve real-world and mathematical problems.* • Understand that sine, cosine, and tangent are ratios of sides in a right triangle and the ratios remain constant for each angle measure. • Demonstrate that sin x = cos (90-x), and use this fact to solve problems in right triangles. • Use first quadrant sine, cosine, and tangent ratios along with the Pythagorean Theorem to solve real world problems.

Grades 9 - 12 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
9-12.3.A . . . select a [linear or exponential] function to model the data, justify the model selection, and use the model to interpret results and make predictions;	Analyze data on a scatter plot and determine a good model. • Determine if a linear or exponential model is a good fit from a scatterplot of the data. • Determine a linear function that best fits data in a scatterplot that suggests a linear model or an exponential function that best fits data in a scatterplot that suggests an exponential model, and use the functions to estimate future trends. • Determine from a plot of the residuals of a scatterplot whether a linear model or exponential model is a good fit for the data.
9-12.3.A collect numerical bivariate data to create a scatterplot, select a function to model the data, justify the model selection, and use the model to interpret results and make predictions;	Analyze and interpret linear models in the context of measurement and data.* • Analyze and interpret the slope and intercepts of a linear model. • Use technology to determine the correlation coefficient of a linear fit and use the correlation coefficient to describe how well the model fits the data. • Identify associations of data that are based on correlation versus causation and explain the difference. Analyze, describe and summarize categorical data represented in two-way frequency tables.* • Analyze and interpret joint, marginal, and conditional relative frequencies in context. • Determine possible trends or associations in the data.

Grades 9 - 12 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
9-12.4.B use the Addition Rule, P(A or B) = P(A) + P(B) - P(A and B), in mathematical and real-world problems;	Use introductory probability techniques and counting rules to evaluate outcomes and determine probabilities.* • Use the formula P(B|A) = P(AnB)/P(A) to determine the conditional probability of A given B and interpret the answers in real world situations. • Use the Addition Rule for dependent and independent events, and interpret the answers in real world situations.
9-12.4.C calculate conditional probabilities and probabilities of compound events using tree diagrams, Venn diagrams, area models, and formulas;	Demonstrate an understanding of conditional probability and use conditional probability in real-world situations.* • Determine the conditional probability of A given B when A and B are dependent events. Identify that A and B are independent events if P(B) is not conditional upon the occurrence of A. • Represent bivariate data in two-way frequency tables and interpret the relative frequencies to determine conditional probabilities and whether events are independent or not. • Relate real world situations to conceptual understandings of conditional probability and independence. Use introductory probability techniques and counting rules to evaluate outcomes and determine probabilities.* • Use the formula P(B|A) = P(AnB)/P(A) to determine the conditional probability of A given B and interpret the answers in real world situations. • Use the Addition Rule for dependent and independent events, and interpret the answers in real world situations.

Grades 9 - 12 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
9-12.4.D interpret conditional probabilities and probabilities of compound events by analyzing representations to make decisions in problem situations;	Demonstrate an understanding of conditional probability and use conditional probability in real-world situations.* • Determine the conditional probability of A given B when A and B are dependent events. Identify that A and B are independent events if P(B) is not conditional upon the occurrence of A. • Represent bivariate data in two-way frequency tables and interpret the relative frequencies to determine conditional probabilities and whether events are independent or not. • Relate real world situations to conceptual understandings of conditional probability and independence. Use introductory probability techniques and counting rules to evaluate outcomes and determine probabilities.* • Use the formula P(B|A) = P(AnB)/P(A) to determine the conditional probability of A given B and interpret the answers in real world situations. • Use the Addition Rule for dependent and independent events, and interpret the answers in real world situations.
9-12.4.E use probabilities to make and justify decisions . . . in everyday life;	Use probability techniques to evaluate outcomes of decisions for real-world situations. • Distinguish between probability events that are fair and unfair and random or not. • For unfair probability events, describe how to make a given outcome fair using probabilities. • Analyze real-world decisions and strategies using probability concepts.

**This skill is related to the aligned standard*

Grades 9 - 12 (continued)

Texas Essential Knowledge and Skills for Mathematics (TEKS)	Aligned Diagnostic Skills
9-12.4.F . . . analyze mathematical fairness . . .	Use probability techniques to evaluate outcomes of decisions for real-world situations. • Distinguish between probability events that are fair and unfair and random or not. • For unfair probability events, describe how to make a given outcome fair using probabilities. • Analyze real-world decisions and strategies using probability concepts.