Math, Grades 6-8 TEKS and TAKS Alignment

§111.22. **Mathematics, Grade 6.**	§111.23. **Mathematics, Grade 7.**	§111.24. **Mathematics, Grade 8.**
(a) Introduction.		
(1) Within a well-balanced mathematics curriculum, the primary focal points are		
using ratios to describe proportional relationships involving number, geometry, measurement, and probability and adding and subtracting decimals and fractions.	*using proportional relationships in number, geometry, measurement, and probability; applying addition, subtraction, multiplication, and division of decimals, fractions, and integers; and using statistical measures to describe data.*	*using basic principles of algebra to analyze and represent proportional and non-proportional relationships and using probability to describe data and make predictions.*
(2) Throughout mathematics in Grades 6-8, students build a foundation of basic understandings in number, operation, and quantitative reasoning; *use concepts, algorithms for addition, subtraction, multiplication, and division as generalizations connected to concrete experiences; and they concretely develop basic concepts of fractions and decimals.* patterns, relationships, and algebraic thinking; *use algebraic thinking to describe how a change in one quantity in a relationship results in a change in the other; and they connect verbal, numeric, graphic, and symbolic representations of relationships*. geometry and spatial reasoning; *use geometric properties and relationships, as well as spatial reasoning, to model and analyze situations and solve problems.* measurement; *communicate information about objects or situations by quantifying attributes, generalize procedures from measurement experiences, and use the procedures to solve problems.* probability and statistics. *use appropriate statistics, representations of data, reasoning, and concepts of probability to draw conclusions, evaluate arguments, and make recommendations*.		
(3) Problem solving, language and communication, connections within and outside mathematics, and formal and informal reasoning underlie all content areas in mathematics. Throughout mathematics in Grades 6-8, students USE THESE PROCESSES TOGETHER WITH TECHNOLOGY (AT LEAST FOUR-FUNCTION CALCULATORS FOR WHOLE NUMBERS, DECIMALS, AND FRACTIONS) AND OTHER MATHEMATICAL TOOLS SUCH AS MANIPULATIVE MATERIALS TO DEVELOP CONCEPTUAL UNDERSTANDING AND SOLVE PROBLEMS AS THEY DO MATHEMATICS.		

Key for TEKS and TAKS:

Yellow Highlight:	Focus for grade level
Underlined:	Knowledge and skills statement
Red Italics:	Student performance expectation - what students will do to show proficiency of the math TEKS
BLUE ALL CAPS:	Process skills
*:	Grade 6-8 Math TAKS objective
#:	Grade 9 Math TAKS Objective
+:	Grade 10 Math TAKS Objective
^:	Grade 11 Exit Level Math TAKS Objective
[Brackets]:	Not specifically tested on TAKS

(b) Knowledge and skills.

(6.1) **Number, operation, and quantitative reasoning.** The student represents and uses rational numbers in a variety of equivalent forms.	(7.1) **Number, operation, and quantitative reasoning.**	(8.1) **Number, operation, and quantitative reasoning.** The student understands that different forms of numbers are appropriate for different situations.
(A)* *compare and order non-negative rational numbers*	(A)* *compare and order integers and positive rational numbers*	(A)* *compare and order rational numbers in various forms including integers, percents, and positive and negative fractions and decimals*
(C)* *use integers to represent real-life situations*		
(B)* *generate equivalent forms of rational numbers including whole numbers, fractions, and decimals*	(B)* *convert between fractions, decimals, whole numbers, and percents mentally, on paper, or with a calculator*	(B)*# *select and use appropriate forms of rational numbers to solve real-life problems including those involving proportional relationships*
(D)* *write prime factorizations using exponents*	(C)* *represent squares and square roots using geometric models*	(C)* *approximate (mentally and with calculators) the value of irrational numbers as they arise from problem situations (π, $\sqrt{2}$)*
(E)* *identify factors and multiples including common factors and common multiples*		(D)* *express numbers in scientific notation, including negative exponents, in appropriate problem situations*
(6.2) **Number, operation, and quantitative reasoning.** The student adds, subtracts, multiplies, or divides to solve problems and justify solutions.	(7.2) **Number, operation, and quantitative reasoning.**	(8.2) **Number, operation, and quantitative reasoning.** The student selects and uses appropriate operations to solve problems and justify solutions.
(A)* *model addition and subtraction situations involving fractions with [objects,] pictures, words, and numbers*	(B)* *use addition, subtraction, multiplication, and division to solve problems involving fractions and decimals*	(A)* *select and use appropriate operations to solve problems and justify the selections*
(B)* *use addition and subtraction to solve problems involving fractions and decimals*	(A)* *represent multiplication and division situations involving fractions and decimals with concrete models, pictures, words, and numbers*	(B)* *add, subtract, multiply, and divide rational numbers in problem situations*

(C)* *use multiplication and division of whole numbers to solve problems including situations involving equivalent ratios and rates*	(C)* *use models to add, subtract, multiply, and divide integers and connect the actions to algorithms*	(D)* *use multiplication by a constant factor (unit rate) to represent proportional relationships;* for example, the arm span of a gibbon is about 1.4 times its height, $a = 1.4h$
	(D)* *use division to find unit rates and ratios in proportional relationships* such as speed, density, price, recipes, and student-teacher ratio	
	(E)* *simplify numerical expressions involving order of operations and exponents*	
	(F)* *select and use appropriate operations to solve problems and justify the selections*	
(D)* *estimate and round to approximate reasonable results and to solve problems where exact answers are not required*	(G)* *determine the reasonableness of a solution to a problem*	(C)* *evaluate a solution for reasonableness*
(6.3) **Patterns, relationships, and algebraic thinking.**	(7.3) **Patterns, relationships, and algebraic thinking.**	(8.3) **Patterns, relationships, and algebraic thinking.**
The student solves problems involving proportional relationships.		The student identifies proportional relationships in problem situations and solves problems.
(A)* *use ratios to describe proportional situations*	(A)* *estimate and find solutions to application problems involving percent*	(A)* *compare and contrast proportional and non-proportional relationships*
(B)* *represent ratios and percents with [concrete] models, fractions, and decimals*		
(C)* *use ratios to make predictions in proportional situations*	(B)* *estimate and find solutions to application problems involving proportional relationships* such as similarity, scaling, unit costs, and related measurement	(B)*#+^ *estimate and find solutions to application problems involving percents and proportional relationships such as similarity and rates*

(6.4) **Patterns, relationships, and algebraic thinking.** The student uses letters as variables in mathematical expressions to describe how one quantity changes when a related quantity changes.	(7.4) **Patterns, relationships, and algebraic thinking.** The student represents a relationship in numerical, geometric, verbal, and symbolic form.	(8.4) **Patterns, relationships, and algebraic thinking.** The student makes connections among various representations of a numerical relationship.
(A)* *use tables and symbols to represent and describe proportional and other relationships involving conversions, sequences, perimeter, area, etc.*	(B)* *graph data to demonstrate relationships in familiar concepts* such as conversions, perimeter, area, circumference, volume, and scaling	(A)**generate a different representation given one representation of data* such as a table, graph, equation, or verbal description
(B)* *generate formulas to represent relationships involving perimeter, area, volume of a rectangular prism, etc., from a table of data*	(A)* *generate formulas involving conversions, perimeter, area, circumference, volume, and scaling*	
	(C)* *describe the relationship between the terms in a sequence and their positions in the sequence*	
(6.5) **Patterns, relationships, and algebraic thinking.** The student uses letters to represent an unknown in an equation.	(7.5) **Patterns, relationships, and algebraic thinking.** The student uses equations to solve problems.	(8.5) **Patterns, relationships, and algebraic thinking.** The student uses graphs, tables, and algebraic representations to make predictions and solve problems.
	(A)* *use [concrete] models to solve equations and use symbols to record the actions*	(A)* *estimate, find, and justify solutions to application problems using appropriate tables, graphs, and algebraic equations*
(A)* *formulate an equation from a problem situation*	(B)* *formulate a possible problem situation when given a simple equation*	(B)* *use an algebraic expression to find any term in a sequence*

(6.6) **Geometry and spatial reasoning.** The student uses geometric vocabulary to describe angles, polygons, and circles.	(7.6) **Geometry and spatial reasoning.** The student compares and classifies shapes and solids using geometric vocabulary and properties.	(8.6) **Geometry and spatial reasoning.** The student uses transformational geometry to develop spatial sense.
(A)* *use angle measurements to classify angles as acute, obtuse, or right*	(A)* *use angle measurements to classify pairs of angles as complementary or supplementary*	(A)*#+ *generate similar shapes using dilations including enlargements and reductions*
(B)* *identify relationships involving angles in triangles and quadrilaterals*	(B)* *use properties to classify shapes including triangles, quadrilaterals, pentagons, and circles*	(B)*#+ *graph dilations, reflections, and translations on a coordinate plane*
(C)* *describe the relationship between radius, diameter, and circumference of a circle*	(C)* *use properties to classify solids, including pyramids, cones, prisms, and cylinders*	
	(D)* *use critical attributes to define similarity*	
(6.7) **Geometry and spatial reasoning.** The student uses coordinate geometry to identify location in two dimensions.	(7.7) **Geometry and spatial reasoning.** The student uses coordinate geometry to describe location on a plane.	
(A)* *locate and name points on a coordinate plane using ordered pairs of non-negative rational numbers*	(A)* *locate and name points on a coordinate plane using ordered pairs of integers*	
	(B)* *graph translations on a coordinate plane*	
	(7.8) **Geometry and spatial reasoning.**	(8.7) **Geometry and spatial reasoning.**
	The student uses geometry to model and describe the physical world.	
	(A)* *sketch a solid when given the top, side, and front views*	(A)*#+ *draw solids from different perspectives*
	(B)* *make a net (two-dimensional model) of the surface area of a solid*	(C)*#+ *use pictures or models to demonstrate the Pythagorean Theorem*
	(C)* *use geometric concepts and properties to solve problems in fields such as art and architecture*	(B)*#+ *use geometric concepts and properties to solve problems in fields such as art and architecture*
		(D)*#+ *locate and name points on a coordinate plane using ordered pairs of rational numbers*

(6.8) **Measurement.** The student solves application problems involving estimation and measurement of length, area, time, temperature, capacity, weight, and angles.	(7.9) **Measurement.** The student solves application problems involving estimation and measurement.	(8.8) **Measurement.** The student uses procedures to determine measures of solids.
(A)* *estimate measurements and evaluate reasonableness of results*	(A)* *estimate measurements and solve application problems involving length (including perimeter and circumference), area, and volume*	(C)*#+ *estimate answers and use formulas to solve application problems involving surface area and volume*
(B)* *select and use appropriate units, tools, or formulas to measure and to solve problems involving length (including perimeter and circumference), area, time, temperature, capacity, and weight*		(A)*#+ *find surface area of prisms and cylinders using concrete models and nets (two-dimensional models)*
(C)* *measure angles*		(B)#+ *connect models to formulas for volume of prisms, cylinders, pyramids, and cones*
(D)* *convert measures within the same measurement system (customary and metric) based on relationships between units*		
		(8.9) **Measurement.** The student uses indirect measurement to solve problems.
		(A)*#+ *use the Pythagorean Theorem to solve real-life problems*
		(B)*#+ *use proportional relationships in similar shapes to find missing measurements*
		(8.10) **Measurement.** The student describes how changes in dimensions affect linear, area, and volume measures.
		(A)*#+ *describe the resulting effects on perimeter and area when dimensions of a shape are changed proportionally*
		(B)*#+ *describe the resulting effect on volume when dimensions of a solid are changed proportionally*

(6.9) **Probability and statistics.** The student uses experimental and theoretical probability to make predictions.	(7.10) **Probability and statistics.** The student recognizes that a physical or mathematical model can be used to describe the probability of real-life events.	(8.11) **Probability and statistics.** The student applies concepts of theoretical and experimental probability to make predictions.
(A)* *construct sample spaces using lists, tree diagrams, and combinations*	(A)* *construct sample spaces for compound events (dependent and independent)*	(A)*#+^ *find the probabilities of compound events (dependent and independent)*
(B)* *find the probabilities of a simple event and its complement and describe the relationship between the two*	(B) *find the approximate probability of a compound event through experimentation*	(B)*#+^ *use theoretical probabilities and experimental results to make predictions and decisions*
		(C) *select and use different models to simulate an event*
(6.10) **Probability and statistics.** The student uses statistical representations to analyze data.	(7.11) **Probability and statistics.** The student understands that the way a set of data is displayed influences its interpretation.	(8.12) **Probability and statistics.** The student uses statistical procedures to describe data.
(C)* *sketch circle graphs to display data*	(A)* *select and use an appropriate representation for presenting collected data and justify the selection*	(A)*#+^ *select the appropriate measure of central tendency to describe a set of data for a particular purpose*
(A)* *draw and compare different graphical representations of the same data*		(C)*#+^ *construct circle graphs, bar graphs, and histograms, [with and] without technology*
(D)* *solve problems by collecting, organizing, displaying, and interpreting data*	(B)* *make inferences and convincing arguments based on an analysis of given or collected data*	(B)* *draw conclusions and make predictions by analyzing trends in scatterplots*
	(7.12) **Probability and statistics.** The student uses measures of central tendency and range to describe a set of data.	(8.13) **Probability and statistics.** The student evaluates predictions and conclusions based on statistical data.
(B)* *use median, mode, and range to describe data*	(A)* *describe a set of data using mean, median, mode, and range*	(A)* *evaluate methods of sampling to determine validity of an inference made from a set of data*
	(B)* *choose among mean, median, mode, or range to describe a set of data and justify the choice for a particular situation*	(B)*#+^ *recognize misuses of graphical or numerical information and evaluate predictions and conclusions based on data analysis*

(6.11) **Underlying processes and mathematical tools.**	(7.13) **Underlying processes and mathematical tools.**	(8.14) **Underlying processes and mathematical tools.**
The student APPLIES MATHEMATICS TO SOLVE PROBLEMS CONNECTED TO EVERYDAY EXPERIENCES, INVESTIGATIONS IN OTHER DISCIPLINES, AND ACTIVITIES IN AND OUTSIDE OF SCHOOL.		
(A)*#+^ IDENTIFY AND APPLY MATHEMATICS TO EVERYDAY EXPERIENCES, TO ACTIVITIES IN AND OUTSIDE OF SCHOOL, WITH OTHER DISCIPLINES, AND WITH OTHER MATHEMATICAL TOPICS		
(B)*#+^ USE A PROBLEM-SOLVING MODEL THAT INCORPORATES UNDERSTANDING THE PROBLEM, MAKING A PLAN, CARRYING OUT THE PLAN, AND EVALUATING THE SOLUTION FOR REASONABLENESS		
(C)*#+^ SELECT OR DEVELOP AN APPROPRIATE PROBLEM-SOLVING STRATEGY FROM A VARIETY OF DIFFERENT TYPES, INCLUDING DRAWING A PICTURE, LOOKING FOR A PATTERN, SYSTEMATIC GUESSING AND CHECKING, ACTING IT OUT, MAKING A TABLE, WORKING A SIMPLER PROBLEM, OR WORKING BACKWARDS TO SOLVE A PROBLEM		
(D) SELECT TOOLS such as real objects, manipulatives, paper/pencil, AND TECHNOLOGY OR TECHNIQUES such as mental math, estimation, and number sense TO SOLVE PROBLEMS		
(6.12) **Underlying processes and mathematical tools.**	(7.14) **Underlying processes and mathematical tools.**	(8.15) **Underlying processes and mathematical tools.**
The student COMMUNICATES ABOUT MATHEMATICS THROUGH INFORMAL AND MATHEMATICAL LANGUAGE, REPRESENTATIONS, AND MODELS.		
(A)*#+^ COMMUNICATE MATHEMATICAL IDEAS USING LANGUAGE, EFFICIENT TOOLS, APPROPRIATE UNITS, AND GRAPHICAL, NUMERICAL, PHYSICAL, OR ALGEBRAIC MATHEMATICAL MODELS		
(B) EVALUATE THE EFFECTIVENESS OF DIFFERENT REPRESENTATIONS TO COMMUNICATE IDEAS		
(6.13) **Underlying processes and mathematical tools.**	(7.15) **Underlying processes and mathematical tools.**	(8.16) **Underlying processes and mathematical tools.**
The student USES LOGICAL REASONING TO MAKE CONJECTURES AND VERIFY CONCLUSIONS.		
(A)*#+^ MAKE CONJECTURES FROM PATTERNS OR SETS OF EXAMPLES AND NONEXAMPLES		
(B)*#+^ VALIDATE HIS/HER CONCLUSIONS USING MATHEMATICAL PROPERTIES AND RELATIONSHIPS		