

HPISD Grade 7 7/8 Math

Mathematical Process Standards	<p>The student uses mathematical processes to:</p> <ul style="list-style-type: none"> acquire and demonstrate mathematical understanding <p>The student is expected to:</p>					
		Nine Weeks:	1	2	3	4
	Apply mathematics to problems arising in everyday life, society, and the workplace. 7.1A	X	X	X	X	
	Use a problem solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution. 7.1B	X	X	X	X	
	Select tools, including real objects, manipulatives, paper/pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense, as appropriate to solve problems. 7.1C	X	X	X	X	
	Communicate mathematical ideas, reasoning, and their implications using multiple representation, including symbols, diagrams, graphs, and language. 7.1D	X	X	X	X	
	Create and use representations to organize, record, and communicate mathematical ideas. 7.1E	X	X	X	X	
	Analyze mathematical relationships to connect and communicate mathematical ideas. 7.1F	X	X	X	X	
Display, explain and justify mathematical ideas and arguments using precise mathematical language in written or oral communications. 7.1G	X	X	X	X		
Numbers and Operations	<p>The student applies mathematical process standards to:</p> <ul style="list-style-type: none"> represent and use rational numbers in a variety of forms. add, subtract, multiply, and divide while solving problems and justifying solutions. <p>The student is expected to:</p>					
		Nine Weeks:	1	2	3	4
	Extend previous knowledge of sets and subsets using a visual representation to describe relationships between sets of rational numbers. 7.2A	X				X
	Add, subtract, multiply, and divide rational numbers fluently. 7.3A	X				X
Apply and extend previous understandings of operations to solve problems using addition, subtraction, multiplication, and division of rational numbers. 7.3B	X				X	

- The student applies mathematical process standards to:
- represent and solve problems involving proportional relationships,
 - use geometry to describe or solve problems involving proportional relationships
 - use probability and statistics to describe or solve problems involving proportional relationships

The student is expected to:

Nine Weeks:		1	2	3	4
Proportionality	Represent constant rates of change in mathematical and real-world problems given pictorial, tabular, verbal, numeric, graphical, and algebraic representations, including $d = rt$. 7.4A			X	
	Calculate unit rates from rates in mathematical and real-world problems. 7.4B			X	
	Determine the constant of proportionality ($k = y/x$) within mathematical and real-world problems. 7.4C			X	
	Solve problems involving ratios, rates, and percents, including multi-step problems involving percent increase and percent decrease, and financial literacy problems. 7.4D	X			
	Convert between measurement systems, including the use of proportions and the use of unit rates. 7.4E	X			
	Generalize the critical attributes of similarity, including ratios within and between similar shapes. 7.5A			X	
	Describe π as the ratio of the circumference of a circle to its diameter. 7.5B			X	
	Solve mathematical and real-world problems involving similar shape and scale drawings. 7.5C			X	
	Represent sample spaces for simple and compound events using lists and tree diagrams. 7.6A	X			
	7.6B select and use different simulations to represent simple and compound events with and without technology;	X			
	7.6C make predictions and determine solutions using experimental data for simple and compound events;	X			
	7.6D make predictions and determine solutions using theoretical probability for simple and compound events;	X			
	7.6E find the probabilities of a simple event and its complement and describe the relationship between the two;	X			
	7.6F use data from a random sample to make inferences about a population;	X			
	7.6G solve problems using data represented in bar graphs, dot plots, and circle graphs, including part-to-whole and part-to-part comparisons and equivalents. 7.6G	X			
	Solve problems using qualitative and quantitative predictions and comparisons from simple experiments. 7.6H	X			
	Determine experimental and theoretical probabilities related to simple and compound events using data and sample spaces. 7.6I	X			

Expressions, Equations, and Relationships	<p>The student applies mathematical process standards to:</p> <ul style="list-style-type: none"> represent linear relationships using multiple representations, develop geometric relationships with volume. solve geometric problems. use one-variable equations and inequalities to represent situations. <p>The student is expected to:</p>								
		Nine Weeks:				1	2	3	4
	Represent linear relationships using verbal descriptions, tables, graphs, and equations that simplify to the form $y = mx + b$. 7.7A				X				
	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. 7.8A					X			
	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. 7.8B					X			
	Use models to determine the approximate formulas for the circumference and area of a circle and connect the models to the actual formulas. 7.8C				X				
	Solve problems involving the volume of rectangular prisms, triangular prisms, rectangular pyramids, and triangular pyramids. 7.9A					X			
	Determine the circumference and area of circles. 7.9B				X				
	Determine the area of composite figures containing combinations of rectangles, squares, parallelograms, trapezoids, triangles, semicircles, and quarter circles. 7.9C				X				
	Solve problems involving the lateral and total surface area of a rectangular prism, rectangular pyramid, triangular prism, and triangular pyramid by determining the area of the shape's net. 7.9D					X			
	Write one-variable, two-step equations and inequalities to represent constraints or conditions within problems. 7.10A				X	X			
Represent solutions for one-variable, two-step equations and inequalities on number lines. 7.10B				X	X				
Write a corresponding real-world problem given a one-variable, two-step equation or inequality. 7.10C				X	X				

Measurement and Data	The student applies mathematical process standards to:				
	<ul style="list-style-type: none"> • solve one-variable equations and inequalities; • use statistical representations to analyze data. 				
	The student is expected to:				
	Nine Weeks:				
		1	2	3	4
	Model and solve one-variable, two-step equations and inequalities. 7.11A		X	X	
	Determine if the given value(s) make(s) one-variable, two-step equations and inequalities true. 7.11B		X	X	
	Write and solve equations using geometry concepts, including the sum of the angles in a triangle, and angle relationships. 7.11C			X	
Compare two groups of numeric data using comparative dot plots or box plots by comparing their shapes, centers, and spreads. 7.12A	X				
Use data from a random sample to make inferences about a population. 7.12B	X				
Compare two populations based on data in random samples from these populations, including informal comparative inferences about differences between the two populations. 7.12C	X				
Financial Literacy	The student applies mathematical process standards to				
	<ul style="list-style-type: none"> • develop an economic way of thinking and problem solving useful in one's life as a knowledgeable consumer and investor 				
	The student is expected to:				
	Nine Weeks:				
		1	2	3	4
	Calculate the sales tax for a given purchase and calculate income tax for earned wages 7.13A	X			X
	Identify the components of a personal budget, including income; planned savings for college, retirement, and emergencies; taxes; and fixed and variable expenses, and calculate what percentage each category comprises of the total budget. 7.13B				X
	Create and organize a financial assets and liabilities record and construct a net worth statement. 7.13C				X
Use a family budget estimator to determine the minimum household budget and average hourly wage needed for a family to meet its basic needs in the student's city or another large city nearby. 7.13D				X	
Calculate and compare simple interest and compound interest earnings. 7.13E				X	
Analyze and compare monetary incentives, including sales, rebates, and coupons. 7.13F				X	

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		Nine Weeks:	1	2	3	4
	Apply mathematics to problems arising in everyday life, society, and the workplace. 8.1A	X	X	X	X	
	Use a problem solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution. 8.1B	X	X	X	X	
	Select tools, including real objects, manipulatives, paper/pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense, as appropriate to solve problems. 8.1C	X	X	X	X	
	Communicate mathematical ideas, reasoning, and their implications using multiple representation, including symbols, diagrams, graphs, and language. 8.1D	X	X	X	X	
	Create and use representations to organize, record, and communicate mathematical ideas. 8.1E	X	X	X	X	
	Analyze mathematical relationships to connect and communicate mathematical ideas. 8.1F	X	X	X	X	
	Display, explain and justify mathematical ideas and arguments using precise mathematical language in written or oral communications. 8.1G	X	X	X	X	
Numbers and Operations	<p>The student applies mathematical process standards to:</p> <ul style="list-style-type: none"> represent and use real numbers in a variety of forms. <p>The student is expected to:</p>					
		Nine Weeks:	1	2	3	4
	Extend previous knowledge of sets and subsets using a visual representation to describe relationships between sets of real numbers. 8.2A	X	X		X	
	Approximate the value of an irrational number, including π and square roots of numbers less than 225, and locate that rational number approximation on a number line. 8.2B		X			
	Convert between standard decimal notation and scientific notation. 8.2C		X			
Order a set of real numbers arising from mathematical and real-world contexts. 8.2D	X	X				

- The student applies mathematical process standards to:
- use proportional relationships to describe dilations
 - explain proportional and non-proportional relationships involving slope
 - use proportional and non-proportional relationships to develop foundational concepts of functions.

The student is expected to:

Nine Weeks: **1** **2** **3** **4**

Proportionality

Generalize that the ratio of corresponding sides of similar shapes are proportional, including a shape and its dilation. 8.3A			X	
Compare and contrast the attributes of a shape and its dilation(s) on a coordinate plane. 8.3B			X	
Use an algebraic representation to explain the effect of a given positive rational scale factor applied to two-dimensional figures on a coordinate plane with the origin as the center of dilation. 8.3C			X	
Use similar right triangles to develop an understanding that slope, m , given as the rate comparing the change in y -values to the change in x -values, $(y_2 - y_1)/(x_2 - x_1)$, is the same for any two points (x_1, y_1) and (x_2, y_2) on the same line. 8.4A			X	
Graph proportional relationships, interpreting the unit rate as the slope of the line that models the relationship. 8.4B			X	
Use data from a table or graph to determine the rate of change or slope and y -intercept in mathematical and real-world problems. 8.4C			X	
Represent linear proportional situations with tables, graphs, and equations in the form of $y = kx$. 8.5A			X	
Represent linear non-proportional situations with tables, graphs, and equations in the form of $y = mx + b$, where $b \neq 0$. 8.5B			X	
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. 8.5C	X			
Use a trend line that approximates the linear relationship between bivariate sets of data to make predictions. 8.5D	X			
Solve problems involving direct variation. 8.5E			X	
Distinguish between proportional and non-proportional situations using tables, graphs, and equations in the form $y = kx$ or $y = mx + b$, where $b \neq 0$. 8.5F			X	
Identify functions using sets of ordered pairs, tables, mappings, and graphs. 8.5G			X	
Identify examples of proportional and non-proportional functions that arise from mathematical and real-world problems. 8.5H			X	
Write an equation in the form $y = mx + b$ to model a linear relationship between two quantities using verbal, numerical, tabular, and graphical representations. 8.5I		X	X	

- The student applies mathematical process standards to:
- develop mathematical relationships and make connections to geometric formulas,
 - use geometry to solve problems.
 - use one-variable equations or inequalities in problem situations.
 - use multiple representations to develop foundational concepts of simultaneous linear equations

The student is expected to:

Nine Weeks: **1** **2** **3** **4**

Expressions, Equations, and Relationships

Describe the volume formula $V = Bh$ of a cylinder in terms of its base area and its height. 8.6A				X
Model the relationship between the volume of a cylinder and a cone having both congruent bases and heights and connect that relationship to the formulas. 8.6B				X
Use models and diagrams to explain the Pythagorean theorem. 8.6C		X	X	
Solve problems involving the volume of cylinders, cones, and spheres. 8.7A				X
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. 8.7B				X
Use the Pythagorean Theorem and its converse to solve problems. 8.7C		X	X	
Determine the distance between two points on a coordinate plane using the Pythagorean Theorem. 8.7D		X	X	
Write one-variable equations or inequalities with variables on both sides that represent problems using rational number coefficients and constants. 8.8A		X	X	
Write a corresponding real-world problem when given a one-variable equation or inequality with variables on both sides of the equal sign using rational number coefficients and constants. 8.8B		X	X	
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. 8.8C		X	X	
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. 8.8D			X	
Identify and verify the values of x and y that simultaneously satisfy two linear equations in the form $y = mx + b$ from the intersections of the graphed equations. 8.9A			X	

Two-Dimensional Shapes	<p>The student applies mathematical process standards to:</p> <ul style="list-style-type: none"> develop transformational geometry concepts. <p>The student is expected to:</p>								
	Nine Weeks:				1	2	3	4	
	Generalize the properties of orientation and congruence of rotations, reflections, translations, and dilations of two-dimensional shapes on a coordinate plane. 8.10A							X	
	Differentiate between transformations that preserve congruence and those that do not. 8.10B							X	
	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. 8.10C							X	
Model the effect on linear and area measurements of dilated two-dimensional shapes. 8.10D							X		
Measurement and Data	<p>The student applies mathematical process standards to:</p> <ul style="list-style-type: none"> use statistical procedures to describe data <p>The student is expected to:</p>								
	Nine Weeks:				1	2	3	4	
	Construct a scatterplot and describe the observed data to address questions of association such as linear, non-linear, and no association between bivariate data. 8.11A					X			
	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. 8.11B					X			
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. 8.11C					X				
Financial Literacy	<p>The student applies mathematical process standards to</p> <ul style="list-style-type: none"> develop an economic way of thinking and problem solving useful in one's life as a knowledgeable consumer and investor <p>The student is expected to:</p>								
	Nine Weeks:				1	2	3	4	
Solve real-world problems comparing how interest rate and loan length affect the cost of credit; 8.12A								X	

		Nine Weeks:			
		1	2	3	4
Financial Literacy	Calculate the total cost of repaying a loan, including credit cards and easy access loans, under various rates of interest and over different periods using an online calculator; 8.12B				X
	Explain how small amounts of money invested regularly, including money saved for college and retirement, grow over time; 8.12C				X
	Calculate and compare simple interest and compound interest earnings; 8.12D				X
	Identify and explain the advantages and disadvantages of different payment methods; 8.12E				X
	Analyze situations to determine if they represent financially responsible decisions and identify the benefits of financial responsibility and the costs of financial irresponsibility; 8.12F				X
	Estimate the cost of a two-year and four-year college education, including family contribution, and devise a periodic savings plan for accumulating the money needed to contribute to the total cost of attendance for at least the first year of college. 8.12G				X