AWLOs

MATH 8 (52001/52038) 2019

GRADE 8

Number	Priority Level	STANDARDS/AW Learning Objectives	Instructional Depth
refers us to the state or national standard.	*helps us prioritize time and interventions.*	*Standards give us broad expectations. AWLOs describe local teaching expectations and are what we teach to address the standards.*	*describes the level at which the AWLOs are written, providing guidance for planning transformations. Boldfaced depth is instructional goal. Language and Social objectives are used to support goal.*
THE NUMBER SYSTEM			
8.NS.1	**Enhanced**	**Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually, and convert a decimal expansion which repeats eventually into a rational number.**	
		Classify a number as rational or irrational.	**Surface**
		Convert numbers between decimals and fractions, including repeating decimals with denominators of 9.	**Surface**
8.NS.2	**Enhanced**	**Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions; e.g., π^2.**	
		Estimate irrational numbers on a number line by finding the two perfect squares that it lies between. For example, for the approximation of x, show that x is between 8 and 9 and closer to 8.	**Surface**
EXPRESSIONS AND EQUATIONS			
8.EE.1	**Essential**	**Use square root and ~~cube root~~ symbols to represent solutions to equations of the form x^2 = p and ~~x^3 =p,~~ where p is a positive rational number. Evaluate square roots of whole number perfect squares with solutions between 0 and 15 and ~~cube roots~~ of whole number ~~perfect cubes~~ with solutions between 0 and 5. Know that √2 is irrational.**	
		Evaluate square roots of whole number perfect squares with solutions between 0 and 15.	**Surface**
		Know that the square root of any non-perfect square is irrational.	**Surface**
8.EE.4	**Mastery**	**Graph proportional relationships, interpreting its unit rate as the slope (m) of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance time graph to a distance-time equation to determine which of two moving objects has greater speed.**	
		Graph proportional relationships.	Surface
		Find the slope of a line from a graph, equation, table.	Surface
		Compare the slope (rate of change) from two different representations.	Deep
		Compare the slope (rate of change) from a real world example, such as comparing speeds from a time distance graph versus a time distance table.	**Transfer**

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8.EE.5	**Essential**	**Use similar triangles to explain why the slope (m) is the same between any two distinct points on a nonvertical line in the coordinate plane and extend to include the use of the slope formula (when given two coordinate points (x1, y1) and (x2, y2)). Generate the equation y = mx for a line through the origin (proportional) and the equation y = mx + b for a line with slope m intercepting the vertical axis at y-intercept b (not proportional when b ≠ 0).**	
		Find slope given two points.	Surface
		Identify the y-intercept from table, graph, and equation.	Surface
		Write slope as change in y over change in x and know that simplifying slope can represent equivalent fractions or similar triangles.	Deep
		Write equations for real world situations with a non-zero y-intercept, such as headstarts in races or intial fees.	**Transfer**
8.EE.6	**Essential**	**Describe the relationship between the proportional relationship expressed in y = mx and the nonproportional linear relationship y = mx+ b as a result of a vertical translation. Note: be clear with students that all linear relationships have a constant rate of change (slope), but only the special case of proportional relationships (line that goes through the origin) continue to have a constant of proportionality.**	
		Write a linear equations from graphs.	Surface
		Describe how changing the y-intercept effects the line.	**Deep**
8.EE.7	**Mastery**	**Fluently (efficiently, accurately, and flexibly) solve one-step, two-step, and multi-step linear equations ~~and inequalities in one variable,~~ including situations with the same variable appearing on both sides of the equal sign.**	
		Solve multi-step equations with distributive property, combining like terms, and variables on both sides.	Surface
		Identify that an equation may contain one solution, no solution, and infinitely many solutions.	Surface
		Recogninze that simplifying both sides of an equation can result in equivalent expressions meaning infinitely many solutions.	Deep
		Write and solve equations using angle relationships.	Deep
		Write and solve equations using real world situations such as comparing company pricing.	**Transfer**
FUNCTIONS			
8.F.1	**Essential**	**Explain that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.**	
		Determine whether a graph is a function by using the vertical line test.	**Surface**
		Define what a function is.	**Surface**

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		Determine from a table or set of ordered pairs that each input(x) has only one output(y).	**Surface**
8.F.2	**Essential**	**Compare properties of two linear functions represented in a variety of ways (algebraically, graphically, numerically in tables, or by verbal descriptions).**	
		Compare the slope (rate of change) from different representations.	**Surface**
		Compare the y-intercepts from different representations.	**Surface**
8.F.3	**Enhanced**	**Interpret the equation y = mx + b as defining a linear function, whose graph is a straight line; give examples of functions that are not linear.**	
		Explain that if a set of data does not have a contant rate of change then it is not linear.	**Surface**
		Determine that a function is not linear if it does not fit the form y=mx+b.	**Surface**
		Determine that a function is not linear if the points or graph does not form a straight line.	**Surface**
8.F.4	**Essential**	**Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.**	
		Write an equation in y=mx+b from two points using graph, table, description, or formula.	Surface
		Interpret the slope and the y-intercept from different representations.	**Deep**
8.F.5	**Essential**	**Describe qualitatively the functional relationship between two quantities by analyzing a graph; e.g., where the function is increasing or decreasing, linear, or nonlinear. Sketch a graph that exhibits the qualitative features of a function that has been described verbally.**	
		Write a verbal description for two quantities given a graph.	Surface
		Identify parts of graphs as increasing, decreasing, linear, or non-linear.	Surface
		Construct a graph from a verbal description for two quantities.	Deep
		Create a real-world graph based on a modeled situation.	**Transfer**
GEOMETRY			
8.G.1	**Enhanced**	**Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement.**	
		Recognize that an angle is made up by two rays sharing a common endpoint and degrees between 1 and 360.	**Surface**
		Identify an angle as acute or obtuse.	**Surface**

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8.G.2	**Enhanced**	**Measure angles in whole-number degrees using a protractor. Draw angles of specified measure using a protractor and straight edge.**	
		Measure angles in whole number degrees using a protractor.	**Surface**
		Draw angles in whole number degrees using a protractor.	**Surface**
8.G.3	**Essential**	**Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems; e.g., by using an equation with a symbol for the unknown angle measure.**	
		Understand that two adjacent angles can be added together to form a larger angle.	Surface
		Solve addition and subtraction problems to find the unknown angle.	Deep
		Calculate the missing angles by setting up an equation such as looking at angles on a blueprint.	**Transfer**
8.G.4	**Mastery**	**Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and use them to solve simple equations for an unknown angle in a figure.**	
		Identify supplementary, complementary, vertical, and adjacent angles.	Surface
		Write and solve multi-step equation involving types of angles.	**Deep**
8.G.5	**Enhanced**	**Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the ~~angle-angle criterion for similarity of triangles.~~ For example, arrange three copies of the same triangle so that the sum of the three angles appears to form a line, and give an argument in terms of transversals why this is so.**	
		Identify and use the angle sum theorem and exterior angle of triangles.	Surface
		Find missing angles using parallel lines cut by a transversal.	Surface
		Write and solve multi-step equation involving types of angles.	**Deep**
8.G.7	**Essential**	**Explain a proof of the Pythagorean Theorem and its converse.**	
		Discover the formula for Pythagorean Theorem.	Surface
		Determine if a triangle is a right triangle using Pythagorean Theorem.	**Deep**
8.G.8	**Mastery**	**Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.**	
		Solve problems using Pythagorean Theorem to find an unknown side.	Surface
		Estimate and determine if answers are reasonable for a side length of a right triangle that is an irrational number.	Deep

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		Create and solve real world problems using Pythagorean Theorem such as height of buildings and construction.	**Transfer**
8.G.9	**Mastery**	**Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.**	
		Draw legs of right triangle to use Pythagorean Theorem to find the distance of a diagnal line.	Surface
		Draw a line that is an irrational distance using Pythagorean Theorem.	Deep
		Solve real-world problems to find distance between two points such as maps.	**Transfer**
STATISTICS AND PROBABILITY			
8.SP.1	**Mastery**	**Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.**	
		Identify patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.	Surface
		Interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities.	Deep
		Use technology to construct and interpret scatter plots using real world data for bivariate measurement data to investigate patterns of association between two quantities.	**Transfer**
8.SP.2	**Essential**	**Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line.**	
		Draw a line of fit on a scatterplot.	Surface
		Explain how well a line of fit matches the scatterplot.	Deep
		Use technology to plot data on a scatterplot and assign a line of best fit.	**Transfer**
8.SP.3	**Essential**	**Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept.**	
		Estimate the slope and y-intercept for a scatterplot with a linear association.	Surface
		Explain the meaning of the slope and y-intercept for a scatterplot based on a real life situation such as the relationship between height and shoe size.	Deep
		Use the linear model to make predictions for data values within and beyond the data set.	**Transfer**