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| Learning Objectives | Practices | | Reason & Explanations | | | | Notes | |
| Algebra Skills | | | | | | | | |
| **A.SSE.1.a** I know the vocabulary (expression, terms, factors, and coefficients) and can identify them in linear and exponential expressions.  **A.REI.1** I can solve linear equations and justify each step in the solution using Algebraic properties.  **A.REI.3.a** I can solve linear equations and inequalities in one variable.  **A.REI.3.b** I can solve a literal equation for a given variable including equations with coefficients represented by letters.  **For example:** A*x* + B*y* = c: solve for B  **A.CED.4** I can isolate a variable in a formula.  **For example:** Given , I can solve for *F*. |  | |  | | | |  | |
| Geometry Constructions | | | | | | | | |
| **G.CO.1** I can precisely define an angle, circle, perpendicular line, parallel line, and line segment based on the undefined notions of point, line, distance along a line, and distance around a circular arc.  **G.CO.12a** I can copy and construct a segment and an angle and explain why the procedure is accurate.  **G.CO.12b** I can bisect a segment and an angle and explain why the procedure is accurate.  **G.CO.13** I can construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle and explain why the procedure results in the desired object.  **G.CO.7** I can show that two triangles are congruent if and only if corresponding pairs of sides and angles are congruent.  **G.CO.8** I can identify the minimum conditions (ASA, SAS, AAS, SSS, or exceptions to SSA)  **G.CO.12c** I can construct perpendicular lines, including the perpendicular bisector of a line segment; and construct a line parallel to a given line through a point not on a line and explain why the procedure results in the desired object. |  | |  | | | |  | |
| Coordinate Geometry and Proofs of Quadrilaterals in Coordinate Plane | | | | | | | | |
| **G.GPE.7** I can use tools of coordinate geometry (distance formula) to compute perimeters of any polygon and areas of right triangles.  **G.GPE.5a** I can determine if two lines are parallel, perpendicular or neither.  **G.GPE.4** I can use the midpoint formula, slope, and the Pythagorean Theorem (distance formula) with coordinates to prove the following (but not limited to):   * If both pairs of opposite sides of a quadrilateral are congruent then the quadrilateral is a parallelogram. * Both pairs of opposite sides of a quadrilateral are parallel then the quadrilateral is a parallelogram. * If one pair of opposite sides of a quadrilateral is parallel and congruent then the quadrilateral is a parallelogram. * If the diagonals of a quadrilateral bisect each other then the quadrilateral is a parallelogram. * If all four sides of a quadrilateral are parallel and congruent, then the quadrilateral is a rhombus. * If all four angles of a quadrilateral are parallel and congruent, then the quadrilateral is a square.   If the opposite sides of a quadrilateral are both parallel and the consecutive sides are perpendicular, the quadrilateral is a rectangle. |  | | |  | | | |  |
| Functions | | | | | | | | |
| **F.IF.1.d** I can explain what it means to be a function.  **F.IF.1.c** I can identify whether a relation is a function by looking at a table of values or by looking at the graph.  **F.IF.1.a** I can explain the relationship between *x* and , that  notation means “the *y*-value of the function *f* at *x*”.  **F.IF.1.b** I can identify the domain (input, ­x­-value) and range (output, *y*-value, ) of a function from an equation, table, or graph.  **F.IF.5** I can determine an appropriate domain for the given context of a function.  **F.IF.2.a** I can evaluate functions in  notation for values in the domain.  **F.IF.1.b** I can identify the domain (input, ­x­-value) and range (output, *y*-value, ) of a function from an equation, table, or graph.  **F.IF.5** I can determine an appropriate domain for the given context of a function.  **F.IF.2.a** I can evaluate functions in  notation for values in the domain.  **F.BF.1.b** I can combine standard function types using arithmetic operations.  **For example:** Find , , ,  given  and .  **F.IF.2.b** I can interpret statements that use function notation in terms of a context. For example, given the amount of money in a savings account is , I can explain what  represents.  **A.REI.10.a** I can identify the coordinates of a linear and exponential function from a graph as solutions to an equation/function.  **A.REI.10.b** I can graph points that satisfy a linear or exponential function and explain the meaning of each coordinate in relation to the function, using function notation.  **A.REI.10.c** I can explain why a continuous curve (including lines) contains an infinite number of solutions. |  | | |  | | | |  |
| Review of Linear Functions | | | | | | | | |
| **F.LE.1.b** I can recognize contextual situations with a common difference between terms.  **F.IF.3.c** I can recognize the relationship between arithmetic sequences and linear functions.  **F.BF.2.a** I understand that a linear relationship can be represented as an arithmetic sequence.  **F.LE.2.a** I can construct a linear function given either: **1)** an arithmetic sequence, **2)** a graph, **3)** a description or **4)** input/output pairs.  **S.ID.7** Given a linear model, I can interpret the slope and the y-intercept in the context of the data.  **F.IF.7.a** I can graph linear functions and identify slope and intercepts (simple cases by hand and complex cases using technology).  **A.REI.12.a** I can graph the solution to linear inequalities in two variables and explain the meaning of the shaded regions (solutions) and non-shaded regions (not solutions).  **S.ID.6.c**  I can use technology to create a linear regression for the data set.  **G.GPE.5b** I can write an equation of a line through a point that is parallel or perpendicular to a given line. |  | | |  | | | |  |
| Linear or Exponential | | | | | | | | |
| **F.IF.6.a** I can calculate and interpret the average rate of change of a function between two values.  **F.IF.6.b** I can calculate and interpret the average rate of change of a function from a graph or table and explain what it means in terms of the function.  **F.IF.6.c** I can estimate the (instantaneous) rate of change at a point from a graph.  **F.LE.1.a** I understand and can prove that linear functions grow by equal differences over equal intervals and that exponential functions grow by equal factors over equal intervals.  **F.LE.3** I can explain and show why a quantity increasing exponentially will eventually exceed a quantity increasing linearly.  **A.CED.2.a** I can create two variable linear and exponential equations and use them to compare two quantities.  **For example:** Given two populations that follow linear or exponential growth models, I can find when the populations will be the same, and which population is bigger in 20 years.  **F.IF.9** I can compare properties of two functions represented in different ways.  **For example:** Given a table of one function and a graph of another, find the best way to determine which function grows faster or has a greater y intercept.  **F.LE.1.c** I can recognize contextual situations with a common ratio between terms.  **F.BF.2.b** I understand that an exponential relationship can be represented as a geometric sequence.  **F.IF.3.d** I can recognize the relationship between geometric sequences and exponential functions.  **F.IF.3.b** I can recognize and find values of recursive sequences.  **For example**: The Fibonacci sequence is defined recursively by *f(0) = f(1) =1*, *f(n+1)=f(n) +f(n-1)* for *n1*.  **F.LE.1.c** I can recognize contextual situations with a common ratio between terms.  **F.BF.2.b** I understand that an exponential relationship can be represented as a geometric sequence.  **F.IF.3.d** I can recognize the relationship between geometric sequences and exponential functions.  **F.IF.3.b** I can recognize and find values of recursive sequences.  **For example**: The Fibonacci sequence is defined recursively by *f(0) = f(1) =1*, *f(n+1)=f(n) +f(n-1)* for *n1*.  **F.BF.1.a** I can write an explicit expression (function rule) or recursive process that describes a linear or exponential relationship between two quantities.  **F.BF.2.d** I can write an explicit rule given a recursive definition and vice versa.  **F.LE.2.b** I can construct an exponential function given either: **1)** a geometric sequence, **2)** a graph, **3)** a description or **4)** input/output pairs. |  |  | | | |  | | |
| Transformations | | | | | | | | |
| **G.CO.2.a** I can identify different transformations (translation, rotation, dilation, reflection) on an object.  **G.CO.2.c** I can distinguish between rigid and non-rigid transformations.  **G.CO.6a** I can identify the types of transformations that result in a rigid motion on a figure.  **G.CO.6b** I can predict the effect of transformations to determine if two figures are congruent.  **G.CO.5.b** I can describe the series of transformations from an image to a pre-image.  **G.CO.2.b** I can perform a series of transformations on an object.  **G.CO.5.a** I can perform a series of transformations on a figure (using graph paper, tracing paper, technology, etc).  **G.CO.3.b** I can recognize rotational and reflectional symmetry.  **G.CO.3.a** I can describe the rotations and reflections of a rectangle, parallelogram, trapezoid or regular polygon that carry it onto itself.  **G.CO.4** I can define transformations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.  **F.BF.3.a** I can identify and explain the following transformations on a linear or exponential function (with or without technology).  **For example:**  (Vertical translation)  (Horizontal translation)  (Vertical stretch/compression, vertical reflection)  (Horizontal stretch/compression, horizontal reflection)    **F.BF.3.b** I can determine the value of *k* (see above) given the graph. |  |  | | | |  | | |
| Systems of Equations | | | | | | | | |
| **A.REI.11.c** I can explain why the *x*-coordinate at the point of intersection of two functions is the solution to .  **For example:** Use graphs and tables to find the *x*-value(s) that results in an equal output for both functions:    **A.REI.11.a** I can approximate solutions to a system of equations by graphing (with and without technology) to approximate the intersection of the curves.  **A.REI.11.b** I can approximate solutions to a system of equations using tables (with and without technology).  **A.REI.6** I can solve systems of linear equations in two variables using the following methods:  **1)** Substitution  **2**) Linear combination/Elimination  **3**) Graphing  **A.REI.5** I can explain why using a linear combination produces another equation that has the same solution as the original system of equations.  **A.REI.12.b** I can graph the solution to systems of linear inequalities in two variables and explain the meaning of the shaded regions (solutions) and non-shaded regions (not solutions).  **A.CED.3** Write and graph equations and inequalities representing constraints in contextual situations.  **For example:** If I have $300 to spend, and hot dogs cost $2 per pound and hamburger costs $4 per pound, Determine what possible amounts of hamburger and hot dogs I can buy.  **For example:** Linear programming |  |  | | |  | | | |
| Distributions and Two-way Tables | | | | | | | | |
| **S.ID.1** I can create or interpret dot plots, histograms and box plots to represent data sets.  **S.ID.2.a** I can compare distribution graphs using comparisons of center (median, mean) and spread (interquartile range, standard deviation).  **S.ID.2.b** I can describe corresponding shapes of graphs given information about center and spread for data sets.  **S.ID.3** I can describe the changes in shape, center and spread that are caused by outliers.  **S.ID.5.a** I can create a two-way frequency table from categorical data.  **S.ID.5.b** Given a 2-way table, I can count the following frequencies  - Joint frequency  - Marginal frequency  - Conditional relative frequency  **For example:**   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  | Spanish Class | French Class | German Class | Total | | Boy | 18 | 10 | 15 | 43 | | Girl | 20 | 7 | 3 | 30 | | Total | 38 | 17 | 18 | 73 |   **Joint frequency:** What is the number of girls in German class?  **Marginal frequency**: What is the number of students in French class?  **Conditional relative frequency:** This really only applies to probability. |  |  | | |  | | | |
| Modeling, Overarching (This unit does not exist on its own but should be included throughout the year as other units are taught.) | | | | | | | | |
| **N.Q.2** I can identify appropriate units for modeling different contextual situations.  **For example:** It’s normally not appropriate to measure the height of a person in mm.  **A.SSE.1.b** I can determine the real world context of the variables in an expression.  **For example:** For  I understand what *P* andrepresent and how each affects the total amount.  **N.Q.1.a** I can use unit analysis to help set up and solve contextual situations involving different units.  **For example:** If my answer needs to be in feet and I have a rate of feet per second, I know I need to multiply by seconds to get the number of feet.  **For example:** Which is the best unit rate: bottles per dollar or dollars per bottle?  **N.Q.3** I can chose a level of accuracy appropriate to limitations on measurement when reporting quantities.  **For example:** When finding the volume of a sphere, if the radius is given in cm, then the answer does not need to given to the nearest hundredth of a mm.  **For example:** Do not round the answer until the end!!!!  **For example:** Round appropriately based on context of the problem.  **Note:** This standard should be taught throughout the year.  **N.Q.1.b**  I can interpret and use the scales and units in a graph.  **For example:** In the graph of the position of a car over time, where the scale on the y-axis is 15 miles, and the scale on the x-axis is 1 hour, I can find the velocity of the car in mph.  **Note:** This standard should be taught throughout the year. |  |  | | | |  | | |
| Modeling. This is how we compare linear and exponential functions. (This unit does not exist on its own but should be included throughout the year as other units are taught.) | | | | | | | | |
| **F.BF.2.c** I can model situations using arithmetic and geometric sequences  **S.ID.6.a** I can fit a function to the data and use the function fitted to solve problems in the context of the data.  **S.ID.6** I can make a scatter plot with and without technology and determine if the relationship is linear, exponential or neither.  **S.ID.6.b.1** I can calculate the residuals. (Residuals are the vertical distances between each data point and a point on the regression function)  **S.ID.6.b.2** I can make a residual plot with and without technology.  **S.ID.6b.3** I can analyze a residual plot to assess the fit of the regression. (Good or bad fit)  **S.ID.8** I can compute (using technology) and interpret the correlation coefficient.  **S.ID.9** I can distinguish between correlation and causation.  **F.LE.5** I can interpret the parameters of linear and exponential functions within a contextual situation.  **For example:** Plant growth can be modeled with a function: y = 2x + 4. Explain the contextual meaning of 2 and 4 in terms of the plant.  **For example:** Plant growth can be modeled with the function: y = . Explain the contextual meaning of 2 and 4 in terms of the plant.  **A.CED.1** I can create linear and exponential equations and linear inequalities and use them to solve contextual situations. |  |  | | | |  | | |
| Graphing Linear and Exponential Functions (This unit does not exist on its own but should be included throughout the year as other units are taught.) | | | | | | | | |
| **A.CED.2.b** I can graph a linear and exponential equation on the same coordinate axes with labels and scales.  **F.IF.4.a** Given a linear or exponential function , I can identify the following from a graph or a table:   * *x*- and *y*- intercepts * Increasing and decreasing intervals * Positive and negative intervals * Maximum and minimum values (is this relevant to linear and exponential functions) * Symmetry * End behavior   **F.IF.4.b** I can sketch graphs of linear and exponential functions given the key features listed above.  **F.IF7e** I can graph exponential functions and show the following key features of the graph (simple cases by hand and complex cases using technology):   * Intercepts * End behavior |  |  | | | |  | | |