Pre-Algebra Timeline

Review 1 week August 16 – August 24

Numbers 3-4 weeks August 27 –September 21

1. Real Numbers are classified as rational or irrational.
2. The estimation of a non-perfect square root is located between two whole numbers on a number line.
3. Operations on Real Numbers results in rational or irrational values.

Objectives

PA.N.1.4 Classify real numbers as rational or irrational. Explain why the rational number system is closed under addition and multiplication and why the irrational system is not. Explain why the sum of a rational number and an irrational number is irrational; and the product of a non-zero rational number and an irrational number is irrational.
PA.N.1.5 Compare real numbers; locate real numbers on a number line. Identify the square root of a perfect square to 400 or, if it is not a perfect square root, locate it as an irrational number between two consecutive positive integers.

Pre-Algebra Timeline

Expressions, Equations, and Inequalities 4-5 weeks September 24 – October 26

1. Substitution is used to simplify and evaluate algebraic expressions.
2. Properties of operations can be used to justify equivalent expressions.
3. Real world problems that can be represented as linear equations will yield one, infinitely many, or no solution.
4. Independent and dependent variables can be identified in the world around us.

Objectives

PA.A.3.1 Use substitution to simplify and evaluate algebraic expressions.
PA.A.3.2 Justify steps in generating equivalent expressions by identifying the properties used, including the properties of operations (associative, commutative, and distributive laws) and the order of operations, including grouping symbols.
PA.A.4.1 Illustrate, write, and solve mathematical and real-world problems using linear equations with one variable with one solution, infinitely many solutions, or no solutions. Interpret solutions in the original context.
PA.A.4.2 Represent, write, solve, and graph problems leading to linear inequalities with one variable in the form $px + q > r$ and $px + q < r$, where p, q and r are rational numbers.
PA.A.4.3 Represent real-world situations using equations and inequalities involving one variable.

Pre-Algebra Timeline

Linear Equations and Functions 5-6 weeks October 29 to December 14

1. A function is a relationship between an independent and dependent variable.
2. The rate of change describes how one quantity changes in respect to another.
3. Multiple representations can be used to express and analyze linear relationships.
4. Functions can be identified as linear if they can be expressed in slope intercept or graphed in a straight line.
5. Data can be displayed and interpreted using scatterplots.

Objectives

PA.A.1.1 Recognize that a function is a relationship between an independent variable and a dependent variable in which the value of the independent variable determines the value of the dependent variable.
PA.A.1.2 Use linear functions to represent and explain real-world and mathematical situations.
PA.A.1.3 Identify a function as linear if it can be expressed in the form y=mx + b or if its graph is a straight line.
PA.A.2.1 Represent linear functions with tables, verbal descriptions, symbols, and graphs; translate from one representation to another.
PA.A.2.2 Identify, describe, and analyze linear relationships between two variables.
PA.A.2.3 Identify graphical properties of linear functions including slope and intercepts. Know that the slope equals the rate of change, and that the y-intercept is zero when the function represents a proportional relationship.
PA.A.2.4 Predict the effect on the graph of a linear function when the slope or y-intercept changes. Use appropriate tools to examine these effects.
PA.A.2.5 Solve problems involving linear functions and interpret results in the original context.
PA.D.1.3 Collect, display and interpret data using scatterplots. Use the shape of the scatterplot to informally estimate a line of best fit. Use appropriate titles, labels and units.

Pre-Algebra Timeline

Exponents 2-3 weeks December 17 to January 25

1. How can you apply strategies to simplify expressions?
2. How can very large or very small numbers be written and applied in a way that is useful and meaningful?

Objectives

PA.N.1.1 Develop and apply the properties of integer exponents, including $a^0 = 1$ (with a 0), to generate equivalent numerical and algebraic expressions.

PA.N.1.2 Express and compare approximations of very large and very small numbers using scientific notation.

PA.N.1.3 Multiply and divide numbers expressed in scientific notation, express the answer in scientific notation.

Pre-Algebra Timeline

Pythagorean Theroem 2-3 weeks January 28 to February 15

1. Pythagorean Theorem utilizes the special relationship between the three sides of a right triangle.
2. Pythagorean Theorem can be used to find the distance between two points on a coordinate plane.

Objectives

PA.GM.1.1 Informally justify the Pythagorean Theorem using measurements, diagrams, or dynamic software and use the Pythagorean Theorem to solve problems in two and three dimensions involving right triangles.

PA.GM.1.2 Use the Pythagorean Theorem to find the distance between any two points in a coordinate plane.

Pre-Algebra Timeline

Surface Area and Volume 2-3 Weeks February 18 to March 8

1. Surface area and volume can be calculated for a rectangular prism.
2. Surface area and volume can be calculated for a cylinder.

Objectives

PA.GM.2.1 Calculate the surface area of a rectangular prism using decomposition or nets. Use appropriate measurements such as cm^2.

PA.GM.2.2 Calculate the surface area of a cylinder, in terms of π and using approximations for π, using decomposition or nets. Use appropriate measurements such as cm^2.

PA.GM.2.3 Develop and use the formulas $\boldsymbol{V=lwh}$ and $\boldsymbol{V=Bh}$ to determine the volume of rectangular prisms. Justify why base area ($\boldsymbol{B}$) and height ($\boldsymbol{h}$) are multiplied to find the volume of a rectangular prism. Use appropriate measurements such as cm^3.

PA.GM.2.4 Develop and use the formulas $V = \pi r^2 h$ and $V = Bh$ to determine the volume of right cylinders, in terms of π and using approximations for π. Justify why base area (B) and height (h) are multiplied to find the volume of a right cylinder. Use appropriate measurements such as cm^3.

Pre-Algebra Timeline

Measures of Central Tendency 2-3 weeks March 11 – April 5

1. The mean and median of a data set is impacted by inserting or deleting data points.
2. Outliers can have an effect on measures of central tendency.

Objectives

PA.D.1.1 Describe the impact that inserting or deleting a data point has on the mean and the median of a data set. Know how to create data displays using a spreadsheet and use a calculator to examine this impact.
PA.D.1.2 Explain how outliers affect measures of central tendency.

Probability 3-4 Weeks April 8 – May 3

1. Experimental probability can be calculated and the result can be expressed in multiple ways.
2. Experimental probability can be used to make predictions.
3. Samples are used to generalize a population.

Objectives

PA.D.2.1 Calculate experimental probabilities and represent them as percents, fractions and decimals between 0 and 1 inclusive. Use experimental probabilities to make predictions when actual probabilities are unknown.
PA.D.2.2 Determine how samples are chosen (random, limited, biased) to draw and support conclusions about generalizing a sample to a population.
PA.D.2.3 Compare and contrast dependent and independent events.

Pre-Algebra Timeline

Culminating Unit 2-3 weeks May 6 – May 24

1. Patterns can be used to make predictions about data.
2. Patterns and polygons can be used to create tessellations.

Objectives

PA.A.1.2 Use linear functions to represent and explain real-world and mathematical situations.

PA.A.2.1 Represent linear functions with tables, verbal descriptions, symbols, and graphs; translate from one representation to another.

PA.A.2.2 Identify, describe, and analyze linear relationships between two variables.

PA.A.2.3 Identify graphical properties of linear functions including slope and intercepts. Know that the slope equals the rate of change, and that the y-intercept is zero when the function represents a proportional relationship.

PA.D.1.3 Collect, display and interpret data using scatterplots. Use the shape of the scatterplot to informally estimate a line of best fit. Use appropriate titles, labels and units.