SMARTPACKS

High School Math

Algebraic Terms

Lesson Objective: The student will accurately use algebraic terminology.
Subobjective 1: The student will accurately use the following algebraic terms: variable, constant, coefficient, expression, term, equation, and inequality.

Area of Trapezoids, Rhombi, and Kites

Lesson Objective: The student will determine the area of a trapezoid, rhombus, and kite.

Converting Measurements of Rate and Product

Lesson Objective: The student will choose appropriate units of measurement and use ratios to convert within and between measurement systems.
Subobjective 1: The student will convert measurements expressed as rates within and between measurement systems to solve problems.
Subobjective 2: The student will covert measurements expressed as products within and between measurement systems to solve problems.

Dividing Polynomials

Lesson Objective: The student will divide polynomials using long division and synthetic division.
Subobjective 1: The student will determine the factors of a polynomial using long division.
Subobjective 2: The student will determine the factors of a polynomial using synthetic division.

Exponential Patterns

Lesson Objective: The student will identify exponential patterns, exponential functions and their variables, and predict a given term of exponential functions.
Subobjective 1: The student will identify simple exponential patterns and describe them in words, make tables to represent them, represent these patterns pictorially, and represent these patterns symbolically in the form $y=ab^x$.
Subobjective 2: The student will identify the independent and dependent variable for a simple exponential function.
Subobjective 3: The student will find the n^{th} term of a simple exponential function.

Factoring Polynomials

Lesson Objective: The student will factor polynomials using the British method.

Finding the Surface Area of a Surface of Revolution

Lesson Objective: The student will find the surface area of a surface of revolution in rectangular form.
Subobjective 1: The student will reproduce the surface created by rotating a smooth curve about the *x* or *y* axis.
Subobjective 2: The student will use integration to calculate the surface area of the surfaces.

Geometric Probability

Lesson Objective: The student will determine the probability of hitting a particular color on a dartboard.
Subobjective 1: The student will determine the total area of an object.
Subobjective 2: The student will determine the total area of each ring and center circle of a target.
Subobjective 3: The student will use proportions to find the probability of hitting a certain color of the target.

Graphing Functions with the Same Ratio

Lesson Objective: The student will graph functions of relationships where the ratio is always the same.
Subobjective 1: The student will write a function for the relationship of cost to number of items, plot the values, and fit a line to the plot.
Subobjective 2: The student will write a function for the relationship of feet to inches, plot the values, and fit a line to the plot.
Subobjective 3: The student will write a function for the relationship of circumference to the diameter of a circle, plot the values, and fit a line to the plot.

Introduction to Statistics

Lesson Objective: The student will define statistics and provide its purpose.
Subobjective 1: The student will provide examples of collections of data.
Subobjective 2: The student will identify the sample and the population from a list of data.

Linear Equations

Lesson Objective: The student will solve systems of linear equations.
Subobjective 1: The student will solve a system of linear equations with three variables using the process of substitution.
Subobjective 2: The student will solve a system of linear equations with three variables using the process of elimination.

Logical Reasoning

Lesson Objective: The student will understand the concepts of logical reasoning.
Subobjective 1: The student will identify and apply conditional statements.
Subobjective 2: The student will identify and apply biconditional statements.
Subobjective 3: The student will identify and apply converse statements.
Subobjective 4: The student will identify and apply inverse statements.

Manipulating Linear Equations

Lesson Objective: The student will change a linear equation into two different forms.
Subobjective 1: The student will change a linear equation to slope-intercept form.
Subobjective 2: The student will change a linear equation into standard form.
Subobjective 3: The student will list the similarities and differences between slope intercept form and standard form.

Measures of Central Tendency

Lesson Objective: The student will know the definitions of and how to use the measures of central tendency.
Subobjective 1: The student will know the definition of and compute the arithmetic mean, median, and mode of a data set.
Subobjective 2: The student will determine the measure of central tendency that provides the most useful information in a given context.

Perfect Square Integers and Roots

Lesson Objective: The student will use the inverse relationship between raising to a power and extracting the root of a perfect square integer.
Subobjective 1: The student will raise a number to a power and define a perfect square integer.
Subobjective 2: The student will determine the square root of a number.
Subobjective 3: The student will determine, without a calculator, the two integers between which its square root lies and explain why.

Piecewise Functions Absolute Value

Lesson Objective: The student will identify absolute value/linear functions with a given graph, write the function and, given a function, draw the graph.
Subobjective 1: The student will identify absolute value.
Subobjective 2: The student will identify linear functions.
Subobjective 3: The student will identify piecewise absolute value linear functions from a graph.
Subobjective 4: The student will create piecewise absolute value linear function graphs.

Piecewise Quadratic Functions

Lesson Objective: The student will identify piecewise quadratic functions with a given graph and write the function, or, given a function, the student will draw the graph.
Subobjective 1: The student will review piecewise absolute value functions and graphs.
Subobjective 2: The student will identify piecewise quadratic functions.
Subobjective 3: The student will identify piecewise quadratic functions from a graph.
Subobjective 4: The student will draw piecewise quadratic functions into a graph.

Platonic Solids

Lesson Objective: The student will identify the five Platonic solids in terms of their shape, name, and number of sides.
Subobjective 1: The student will identify the number of sides on each shape.
Subobjective 2: The student will name the solid by shape.
Subobjective 3: The student will apply his/her knowledge of Platonic solids in order to demonstrate Euler's Theorem.
Subobjective 4: The student will create his/her own Platonic solids.

Probability of Outcomes

Lesson Objective: The student will represent all possible outcomes for compound events and express a theoretical probability.
Subobjective 1: The student will represent all possible outcomes for a compound event using a table, and express a theoretical probability.
Subobjective 2: The student will represent all possible outcomes for a compound event using a grid, and express a theoretical probability.
Subobjective 3: The student will represent all possible outcomes for a compound event using a tree diagram, and express a theoretical probability.

Rational Exponents

Lesson Objective: The student will manipulate radicals and rational exponents.
Subobjective 1: The student will perform the following computations with radicals: simplify, add, subtract, multiply, divide, and rationalize denominators.
Subobjective 2: The student will turn a radical expression into an expression containing rational exponents.
Subobjective 3: The student will simplify variable expressions containing rational exponents using the laws of exponents.

Representing a Verbal Description Algebraically

Lesson Objective: The student will use variables and appropriate operations to write a representation of a verbal description.
Subobjective 1: The student will use variables and appropriate operations to write an expression from a verbal description.
Subobjective 2: The student will use variables and appropriate operations to write an equation from a verbal description.

Subobjective 3: The student will use variables and appropriate operations to write an inequality from a verbal description.
Subobjective 4: The student will use variables and appropriate operations to write a system of equations from a verbal description.

Set Notation

Lesson Objective: The student will create a union of sets, an intersection of sets, and a complement of sets.
Subobjective 1: The student will create a set from the data given, including an empty set.
Subobjective 2: The student will identify elements of a union of sets.
Subobjective 3: The student will identify elements of a complement of a set.
Subobjective 4: The student will identify elements of an intersection of sets.

Statistics Experiments

Lesson Objective: The student will analyze the different types of methods for collecting data and designing experiments.
Subobjective 1: The student will define the ways to collect data.
Subobjective 2: The student will organize sampling methods based on how they are performed.
Subobjective 3: The student will identify the pros and cons of each sampling method.

Statistics Types of Data

Lesson Objective: The student will define the different types of data, measurements, and levels of measurement in gathering statistical data.
Subobjective 1: The student will review the differences between samples and populations.
Subobjective 2: The student will interpret data and organize it into its correct classification.

Transformations

Lesson Objective: The student will identify and represent specific transformations on a coordinate grid.
Subobjective 1: The student will identify corresponding parts of triangles and quadrilaterals.
Subobjective 2: The student will identify rotations, translations and reflections on a coordinate grid.
Subobjective 3: The student will represent specific transformations on a coordinate grid.

Trigonometry Function Review

Lesson Objective: The student will review basic trigonometric formulas.
Subobjective 1: The student will convert between radians and degrees.
Subobjective 2: The student will calculate arc length.
Subobjective 3: The student will use the unit circle to identify values of the six trigonometric functions (sine, cosine, tangent, secent, cosecent, and cotangent).

Trigonometry Graph Review

Lesson Objective: The student will review basic trigonometric graphs.
Subobjective 1: The student will graph sine, cosine, and tangent curves.
Subobjective 2: The student will calculate the period of each trig function.
Subobjective 3: The student will calculate the amplitude of each trig function.
Subobjective 4: The student will determine the phase shift of each trig function.

Using Perimeter Ratios to Find the Area

Lesson Objective: The student will use ratios to find areas of similar figures.
Subobjective 1: The student will determine the perimeter of a regular polygon.
Subobjective 2: The student will define and identify similar polygons.
Subobjective 3: The student will use the ratio of perimeters to find the area of similar figures.

Validity of Statistical Claims

Lesson Objective: The student will determine the validity of statistical claims.
Subobjective 1: The student will identify claims based on statistical samples and evaluate the validity of those claims.

Variation and Calculating a z-score

Lesson Objective: The student will interpret variation and calculate z-scores.
Subobjective 1: The student will interpret variation in real-world contexts.
Subobjective 2: The student will calculate and interpret mean absolute deviation.
Subobjective 3: The student will calculate and interpret standard deviation.
Subobjective 4: The student will calculate and interpret z-scores.