

Understands numbers, number systems and number relationships

- Present mathematical procedures and results clearly, systematically, succinctly and correctly.
- Analyze a relation to determine whether a direct or inverse variation exists and represent it algebraically and graphically.

Understands computation and estimation

- Use operations (e.g., opposite, reciprocal, absolute value, raising to a power, finding roots, finding logarithms).
- Use estimation to solve problems for which an exact answer is not needed.

Demonstrates mathematical reasoning and connections

- Determine the validity of an argument.
- Demonstrate mathematical solutions to problems (e.g., in the physical sciences).
- Conclude a solution process with a summary of results and evaluate the degree to which the results obtained represent an acceptable response to the initial problem and why the reasoning is valid.
- Give examples of patterns that occur in data from other disciplines.

Demonstrates mathematical problem solving and communication

- Develop and use computation concepts, operations and procedures with real numbers in problem-solving situations.
- Select and use appropriate mathematical concepts and techniques from different areas of mathematics and apply them to solving non-routine and multi-step problems.
- Use symbols, mathematical terminology, standard notation, mathematical rules, graphing and other types of mathematical representations to communicate observations, predictions, concepts, procedures, generalizations, ideas and results.
- Use patterns, sequences and series to solve routine and non-routine problems.

Understands data analysis and statistics

- Determine the validity of the sampling method described in a given study.
- Analyze a given set of data for the existence of a pattern and represent the pattern algebraically and graphically.
- Determine the domain and range of a relation, given a graph or set of ordered pairs.
- Given a set of data points, write an equation for a line of best fit.

Understands algebra and functions

- Construct and apply mathematical models, including lines and curves of best fit, to estimate values of related quantities.
- Demonstrate skills for using computer spreadsheets and scientific and graphing calculators.
- Determine the regression equation of best fit (e.g., linear, quadratic, exponential).
- Formulate expressions, equations, inequalities, systems of equations, systems of inequalities and matrices to model routine and non-routine problem situations.
- Use equations to represent curves (e.g., lines, circles, ellipses, parabolas, hyperbolas).
- Identify whether systems of equations and inequalities are consistent or inconsistent.
- Demonstrate the connection between algebraic equations and inequalities and the geometry of relations in the coordinate plane.
- Solve linear, quadratic and exponential equations both symbolically and graphically.
- Represent functional relationships in tables, charts and graphs.
- Create and interpret functional models.
- Analyze properties and relationships of functions (e.g., linear, polynomial, rational, trigonometric, exponential, and logarithmic).
- Use graphing calculators to display periodic and circular functions; describe properties of the graphs.

Understands geometry

- Select, justify and apply an appropriate technique to graph a linear function in two variables, including slope-intercept, x- and y-intercepts, graphing by transformations and the use of a graphing calculator.
- Analyze and categorize functions by their characteristics.
- Identify corresponding parts in congruent triangles to solve problems.
- Determine sums of finite sequences of numbers and infinite geometric series.

Demonstrates an understanding of trigonometry

- Identify, create and solve practical problems involving right triangles using the trigonometric functions and the Pythagorean Theorem.

Understands concepts of calculus

- Write the equation of a line when given the graph of the line, two points on the line, or the slope of the line and a point on the line.
- Determine maximum and minimum values of a function over a specified interval.
- Interpret maximum and minimum values in problem situations.
- Graph and interpret rates of growth/decay.