Syllabus

Preparation for the GED® Test - Math

Course Overview

The Preparation for the GED® Test Courses were developed by aligning Plato Courseware with the strands and topics that are assessed on the GED® Test. Each unit aligns to one or more strands within the GED® Test and the modules within each unit target the individual indicators on the test. The GED® Test for Math is the study of both numerical and algebraic problem-solving skills. In this course, you will find a variety of lessons and activities to improve your knowledge and skills in these areas.

Course Goals

By the end of this course, you will:

- Represent positive and negative rational numbers on a number line.
- Solve mathematical and real-world problems that contain positive and negative rational numbers.
- Learn to find common factors and compute unit rates related to ratios of fractions.
- Find factors of a polynomial that has monomial factors.
- Learn the different methods to write an expression as the product of two sums or differences.
- Learn to factor a difference of squares, a perfect square trinomial, trinomials of the form $x^2 + bx + c$, and trinomials of the form $ax^2 + bx + c$.
- Explore different algebraic concepts such as variables, monomial and binomial expressions and their associated numerical operations.
- Identify non-permissible values for the variables in a rational expression.
- Solve rational expressions.
- Use variables to represent numbers when solving real-world and mathematical problems.
- Solve linear equations with rational coefficients and more difficult linear equations by isolating the variable.
- Solve linear inequalities using addition, subtraction, multiplication and division.
- Solve linear equations using the substitution method.
- Solve word problems using a system of two linear equations or inequalities.
- Solve quadratic equations in which both sides are perfect squares.
- Solve quadratic equations using factorization.
- Use quadratic equations in one variable to solve practical problems.
- Describe real-world situations as quadratic functions.
- Determine the slope and intercept of a linear relationship from its graph.
- Find the areas of triangles, special quadrilaterals, and polygons by composing or decomposing them into other shapes.

- Examine the Pythagorean Theorem and its converse.
- Study formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.
- Use permutations and combinations to compute probabilities of compound events and to solve problems.

General Skills

To participate in this course, you should be able to do the following:

- Complete basic operations with word processing software, such as Microsoft Word or Google Docs.
- Complete basic operations with presentation software, such as Microsoft PowerPoint or Google Docs presentation.
- Perform online research using various search engines and library databases.
- Communicate through email.

For a complete list of general skills that are required for participation in online courses, refer to the Prerequisites section of the Plato Student Orientation document, found at the beginning of this course.

Course Materials

- notebook
- pencils or ink pens
- computer with Internet connection and speakers or headphones
- Microsoft Word or equivalent
- Microsoft PowerPoint or equivalent

Course Structure

Unit 1: Number Sense

Summary

In this unit, students will represent positive and negative rational numbers on a number line. They will describe statements of order for rational numbers in real-world situations. They will also perform basic operations like addition, subtraction, multiplication, and division of multi digit decimals. Further in the unit, students will solve real-world and mathematical problems that contain positive and negative rational numbers. Later, in this unit, students will learn to find common factors and compute unit rates related to ratios of fractions. They will also compare two different proportional relationships represented in different ways. Later, students will solve problems that involve finding the whole, given a part and the percentage. The unit ends with a lesson where students will learn about the absolute value of a rational number.

Unit 2: Factoring Polynomials

Summary
In this unit, students will find the factors of a polynomial that has monomial factors. They will learn to use the distributive property to write an expression as the product of two sums or differences. Students will also learn how to group terms to write an expression as the product of two sums or differences. Later, they will learn to factor a difference of squares, a perfect square trinomial, trinomials of the form $x^2 + bx + c$, and trinomials of the form $ax^2 + bx + c$.

Unit 3: Polynomial and Rational Expressions

Summary
In this unit, students will learn to calculate the sum of two polynomials, the product of monomials and polynomials, the difference of polynomials, and the product of two polynomials. They will also learn to divide a polynomial by a monomial and a polynomial by a binomial. Later, in this unit, students will evaluate expressions in which letters stand for numbers. They will also use properties of operations to add, subtract, factor, and expand linear expressions that have rational coefficients. Students will identify non-permissible values for the variables in the rational expression. They will learn to solve rational expressions. They will also evaluate a rational expression and apply properties of exponents to rational exponents. Lastly, students will use variables to represent numbers when solving real-world and mathematical problems.

Unit 4: Linear Equations and Inequalities

Summary
In this unit, students will solve linear equations with rational coefficients and more difficult linear equations by isolating the variable. Then, they will write literal equations to solve math problems and use linear math sentences in one variable to solve practical problems. Further in the unit, students will solve linear inequalities using addition, subtraction, multiplication, and division. Next, they will solve more linear inequalities by isolating the variable and use variables to solve real-world or mathematical problems.

Unit 5: System of Equations

Summary
In this unit, students will solve systems of linear equations, systems of inequalities by graphing, systems of linear equations using the linear combinations method and

systems of equations by adding or subtracting. They will also solve practical problems with two variables and linear equations using the substitution method. In the last lesson of the unit, students will solve word problems using a system of two linear equations or inequalities.

Unit 6: Quadratic Equations

Summary

In this unit, students will use square and cube root symbols to represent solutions to equations and evaluate square and cube roots of small perfect squares. Students will solve quadratic equations in which both sides are perfect squares. They will then solve certain types of quadratic equations by factoring. They will also learn to find solutions for quadratic equations of the form $x^2 + bx = 0$, solution for set of quadratic equations that factor as the difference of two squares and solution set for a quadratic equation that is the perfect square of a binomial. Students will find solution set for quadratic equations by factoring and use the quadratic formula to find a solution set for a quadratic equation. Lastly, students will solve quadratic equations by completing the square and use quadratic equations in one variable to solve practical problems.

Unit 7: Functions and Graphs

Summary

In this unit, students will learn that a function assigns one output to each input and that the graph of a function is the set of ordered pairs of inputs and corresponding outputs. They will also compare properties of functions represented in different ways and describe real-world situations using linear functions. Students will then graph and solve quadratic functions, and describe real-world situations as quadratic functions. They will also find and position pairs of integers and other rational numbers on a coordinate plane. Later, in this unit, students will determine the slope and y-intercept of a linear relationship from its graph and analyze if a point is on the graph of a linear equation. They will also learn to graph proportional relationships and interpret the unit rate as the slope. Further in the unit, students will apply the point-slope form of the equation of a line. Lastly, they will prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems.

Unit 8: Geometry

Summary

In this unit, students will find the areas of triangles, special quadrilaterals, and polygons by composing or decomposing them into other shapes. They will also study the formulas for the area and circumference of a circle and use them to solve problems. In one of the course activity, students will find the perimeter of common polygons. They will also examine the Pythagorean Theorem and its converse, and apply the Pythagorean Theorem to find unknown side lengths. In the remaining two course activities, students will find the surface area of prisms, pyramids, cylinders, cones, and spheres. They will also apply volume formulas to find the volumes of right rectangular prisms. In the next lesson, students will study formulas for the volume of cones, cylinders, and spheres and use them to solve real-world and mathematical problems. Students will also represent three-dimensional figures using nets made up of rectangles and triangles and find the surface area of these figures. Lastly, students will solve real-world and mathematical problems that involve area, volume, and surface area of two- and three-dimensional objects and scale drawings of geometric figures.

Unit 9: Probability and Statistics

Summary

In this unit, students will use measures of center and variability to compare two populations. They will learn that the likelihood that a chance event will occur can be expressed as a number between 0 and 1 and the probability of a compound event occurring is a fraction of all possible outcomes. Students will use permutations and combinations to compute probabilities of compound events and to solve problems. They will also represent data with plots on the real number line using dot plots, histograms, and box plots. Lastly, students will summarize data for two categories in two-way frequency tables and interpret their relative frequencies in the context of the data.