Math 8, Semester A

Course Overview

Mathematics is the study of patterns around us. In Math 8, Semester A, you will explore transformations and solve linear equations. You will also solve real-world problems with two linear equations. In this course, you will study and interpret functions that can help you solve problems you encounter in everyday life.

Course Goals

By the end of this course, you will:

- Explore and verify the properties of transformations and describe their effects.
- Understand that two figures are congruent or similar if one can be obtained from the other by a sequence of rotations, reflections, or translations.
- Examine the properties of the angles created when parallel lines are cut by a transversal.
- Solve linear equations with rational coefficients and give examples of linear equations with one, infinitely many, or no solutions.
- Graph proportional relationships, interpreting the unit rate as the slope, and compare two different proportional relationships represented in different ways.
- Derive the equations $y = mx$ and $y = mx + b$.
- Use similar triangles to explain why the slope is the same between any two points on a line.
- Solve a system of linear equations algebraically and by finding the point of intersection.
- Solve real-world and mathematical problems with two linear equations.
- Understand functions, describe properties of linear and nonlinear functions, and compare properties of functions represented in different ways.
- Construct and interpret functions given in verbal descriptions, two coordinate values, tables, or a graph.

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 and Google Docs.
- Understand the basics of spreadsheet software, such as Microsoft Excel and Google Spreadsheets.
- Communicate through email and participate in discussion boards.

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.

Credit Value

Math 8A is a 0.5-credit course.

Course Materials

- Notebook
- Calculator
- Computer with internet connection and speakers or headphones
- Microsoft Excel or equivalent

Course Pacing Guide

This course description and pacing guide is intended to help you stay on schedule with your work. Note that your course instructor may modify the schedule to meet the specific needs of your class.

Unit 1: Transformations

Summary

Unit 1 begins with exploring and verifying the properties of rotations, reflections, and translations. By using coordinates, you will describe the effects of dilations, translations, rotations, and reflections. You will understand that two figures are congruent or similar if one can be obtained from the other by a sequence of rotations, reflections, or translations. Lastly, you will examine the properties of the angles created when parallel lines are cut by a transversal.

Day	Activity/*Objective*	Type
1 day: 1	**Syllabus and Plato Student Orientation** *Review the Plato Student Orientation and Course Syllabus at the beginning of this course.*	Course Orientation
3 days: 2–4	**Properties of Transformations** *Explore properties of rotations, reflections, and translations.*	Lesson
4 days: 5–8	**Experimenting with Transformations** *Verify the properties of rotations, reflections, and translations.*	Course Activity
3 days: 9–11	**Effects of Transformations** *Describe the effects of dilations, translations, rotations, and reflections using coordinates.*	Lesson

Day	Activity/*Objective*	Type
3 days: 12–14	**Congruence and Transformations** *Understand that two figures are congruent if one can be obtained from the other by a sequence of rotations, reflections, or translations.*	Lesson
3 days: 15–17	**Similarity and Transformations** *Understand that two figures are similar if one can be obtained from the other by a sequence of dilations, rotations, reflections, or translations.*	Lesson
3 days: 18–20	**Parallel Lines** *Examine the properties of the angles created when parallel lines are cut by a transversal.*	Lesson
6 days: 21–26	**Unit Activity and Discussion—Unit 1**	Unit Activity Discussion
1 day: 27	**Posttest—Unit 1**	Assessment

Unit 2: Linear Equations

Summary

In this unit, you will solve linear equations with rational coefficients and give examples of linear equations with one, infinitely many, or no solutions. You will graph proportional relationships by interpreting the unit rate as the slope. You will then compare two different proportional relationships represented in different ways. Finally, you will derive the equations $y = mx$ and $y = mx + b$ and use similar triangles to explain why the slope is the same between any two points on a line.

Day	Activity/*Objective*	Type
3 days: 28–30	**Solving Linear Equations** *Solve linear equations with rational coefficients.*	Lesson
3 days: 31–33	**Solutions to Linear Equations** *Give examples of linear equations with one, infinitely many, or no solutions.*	Lesson
3 days: 34–36	**Slope** *Graph proportional relationships, interpreting the unit rate as the slope.*	Lesson

Day	Activity/*Objective*	Type
3 days: 37–39	**Comparing Proportional Relationships** *Compare two different proportional relationships represented in different ways.*	Lesson
3 days: 40–42	**Equations of a Line** *Derive the equations y = mx and y = mx + b.*	Lesson
4 days: 43–46	**Slope and Similar Triangles** *Use similar triangles to explain why the slope is the same between any two points.*	Course Activity
6 days: 47–52	**Unit Activity and Discussion—Unit 2**	Unit Activity Discussion
1 day: 53	**Posttest—Unit 2**	Assessment

Unit 3: Systems of Equations

Summary

Unit 3 focuses on solving a system of linear equations algebraically and by finding the point of intersection. In this unit, you will solve real-world and mathematical problems with two linear equations.

Day	Activity/*Objective*	Type
3 days: 54–56	**Solving Systems of Linear Equations Graphically** *Solve a system of linear equations by finding the point of intersection.*	Lesson
3 days: 57–59	**Solving Systems of Linear Equations Algebraically** *Solve a system of linear equations algebraically.*	Lesson
3 days: 60–62	**Solving Problems with Systems of Linear Equations** *Solve real-world and mathematical problems with two linear equations.*	Lesson
6 days: 63–68	**Unit Activity and Discussion—Unit 3**	Unit Activity Discussion
1 day: 69	**Posttest—Unit 3**	Assessment

Unit 4: Functions

Summary
In this unit, you will understand that a function assigns one output to each input and that the graph of a function is a set of ordered pairs of inputs and corresponding outputs. You will describe properties of linear and nonlinear functions and compare properties of functions represented in different ways. Lastly, you will construct and interpret functions given in verbal descriptions, two coordinate values, tables, or a graph.

Day	Activity/*Objective*	Type
3 days: 70–72	**Introduction to Functions** *Understand that a function assigns one output to each input and that the graph of a function is a set of ordered pairs of inputs and corresponding outputs.*	Lesson
3 days: 73–75	**Properties of Functions** *Describe properties of linear and nonlinear functions.*	Lesson
3 days: 76–78	**Comparing Functions** *Compare properties of functions represented in different ways.*	Lesson
3 days: 79–81	**Constructing and Interpreting Functions** *Construct and interpret functions given in verbal descriptions, two coordinate values, tables, or a graph.*	Lesson
6 days: 82–87	**Unit Activity and Discussion—Unit 4**	Unit Activity Discussion
1 day: 88	**Posttest—Unit 4**	Assessment
1 day: 89	**Semester Review**	
1 day: 90	**End-of-Semester Test**	Assessment

Math 8, Semester B

Course Overview

Mathematics is the study of patterns around us. In Math 8, Semester B, you will study the use of scientific notation and learn to use roots appropriately. You will also plot and compare irrational numbers and simplify expressions with irrational numbers. You will also explore the Pythagorean Theorem and probability, which you can use to solve real-world problems.

Course Goals

By the end of this course, you will:

- Explore properties of exponents, and understand the use of scientific notation.
- Compare, add, subtract, multiply, and divide numbers expressed in scientific notation.
- Work with square and cube roots, and use decimal expansion to understand the real number system.
- Plot and compare irrational numbers, and simplify expressions with irrational numbers.
- Apply facts about angle relationships in triangles.
- Use the Pythagorean Theorem to find unknown side lengths and to find the distance between two points in a coordinate system.
- Learn the formulas for the volume of cones, cylinders, and spheres, and use them to solve real-world and mathematical problems.
- Interpret and describe data in scatter plots, and informally fit lines to model data in scatter plots.
- Apply linear equations from scatter plots, and construct and apply two-way tables.

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 and Google Docs.
- Understand the basics of spreadsheet software, such as Microsoft Excel and Google Spreadsheets.
- Communicate through email and discussion boards.

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.

Credit Value

Math 8B is a 0.5-credit course.

Course Materials

- Notebook
- Calculator
- Computer with internet connection and speakers or headphones
- Microsoft Excel or equivalent

Course Pacing Guide

This course description and pacing guide is intended to help you stay on schedule with your work. Note that your course instructor may modify the schedule to meet the specific needs of your class.

Unit 1: Scientific Notation

Summary

In this unit, you will study and apply the properties of integer exponents and use scientific notation. You will compare numbers expressed in scientific notation, and you will add, subtract, multiply, and divide numbers expressed in scientific notation.

Day	Activity/*Objective*	Type
1 day: 1	**Syllabus and Plato Student Orientation** *Review the Plato Student Orientation and Course Syllabus at the beginning of this course.*	Course Orientation
3 days: 2–4	**Properties of Exponents** *Study and apply the properties of integer exponents.*	Lesson
3 days: 5–7	**Introduction to Scientific Notation** *Use numbers expressed in the form of a single digit times an integer power of 10 to estimate large and small quantities.*	Lesson
3 days: 8–10	**Comparing Numbers Using Scientific Notation** *Compare numbers in scientific notation.*	Lesson
3 days: 11–13	**Adding and Subtracting in Scientific Notation** *Add and subtract numbers expressed in scientific notation.*	Lesson
4 days: 14–17	**Multiplying and Dividing in Scientific Notation** *Multiply and divide numbers expressed in scientific notation.*	Lesson
5 days: 18–22	**Unit Activity and Discussion—Unit 1**	Unit Activity Discussion

Day	Activity/*Objective*	Type
1 day: 23	**Posttest—Unit 1**	Assessment

Unit 2: Roots

Summary

In this unit, you will use square and cube roots. You will also use decimal expansion to understand the real number system. You will use irrational approximations and number diagrams to plot and compare irrational numbers. Finally, you will simplify expressions with irrational numbers and use rational approximations to estimate expressions with irrational numbers.

Day	Activity/*Objective*	Type
3 days: 24–26	**Square and Cube Roots** *Use square and cube root symbols to represent solutions to equations and evaluate square and cube roots of small perfect squares.*	Lesson
3 days: 27–29	**Real Numbers** *Use decimal expansion to understand the real number system.*	Lesson
3 days: 30–32	**Plotting and Comparing Irrational Numbers** *Use irrational approximations and number diagrams to plot and compare irrational numbers.*	Lesson
4 days: 33–36	**Expressions with Irrational Numbers** *Simplify expressions with irrational numbers and use rational approximations to estimate expressions with irrational numbers.*	Lesson
5 days: 37–41	**Unit Activity and Discussion—Unit 2**	Unit Activity Discussion
1 day: 42	**Posttest—Unit 2**	Assessment

Unit 3: The Pythagorean Theorem and Volume

Summary

At the beginning if this unit, you will apply facts about angle relationships in triangles. Using the Pythagorean Theorem and its converse, you will calculate unknown side

lengths. You will also apply the Pythagorean Theorem to find the distance between two points in a coordinate system. Finally, you will find the volumes of cones, cylinders, and spheres and use the volume formulas to solve real-world problems.

Day	Activity/*Objective*	Type
3 days: 43–45	**Angles** *Apply facts about angle relationships in triangles.*	Lesson
3 days: 46–48	**Introduction to the Pythagorean Theorem** *Examine the Pythagorean Theorem and its converse, and apply the Pythagorean Theorem to find unknown side lengths.*	Lesson
4 days: 49–52	**Explaining the Pythagorean Theorem** *Explain a proof of the Pythagorean Theorem and its converse.*	Course Activity
4 days: 53–56	**The Pythagorean Theorem and the Coordinate Plane** *Apply the Pythagorean Theorem to find distances between two points in a coordinate system.*	Lesson
4 days: 57–60	**Volume** *Study formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.*	Lesson
5 days: 61–65	**Unit Activity and Discussion—Unit 3**	Unit Activity Discussion
1 day: 66	**Posttest—Unit 3**	Assessment

Unit 4: Statistics and Probability

Summary

In this unit, you'll interpret and describe data in scatter plots and informally fit lines to model data in scatter plots. You will apply linear equations found for scatter plots, and you will construct and use two-way tables.

Day	Activity/*Objective*	Type
4 days: 67–70	**Introduction to Scatter Plots** *Interpret and describe data in scatter plots.*	Lesson
4 days: 71–74	**Scatter Plots with Linear Associations** *Informally fit lines to model data in scatter plots.*	Lesson

Day	Activity/*Objective*	Type
4 days: 75–78	**Applying Linear Equations from Scatter Plots** *Apply the linear equation found for a scatter plot with a linear association.*	Lesson
4 days: 79–82	**Two-Way Tables** *Construct and apply two-way tables.*	Lesson
5 days: 83–87	**Unit Activity and Discussion—Unit 4**	Unit Activity Discussion
1 day: 88	**Posttest—Unit 4**	Assessment
1 day: 89	**Semester Review**	
1 day: 90	**End-of-Semester Test**	Assessment