

# Syllabus

## Integrated Math 3B

### Course Overview

Integrated Math is a comprehensive collection of mathematical concepts designed to give you a deeper understanding of the world around you. It includes ideas from algebra, geometry, probability and statistics, and trigonometry, and teaches them as interrelated disciplines. It's likely that you've been studying some form of integrated math since elementary school.

In Integrated Math 3B, you will study and apply the laws of sine and cosine functions. You will also investigate the cross sections and density of three-dimensional geometric figures. You will use equations, inequalities, and functions to solve real-world math problems. You will also look at function graphs and explore transformation of functions. You will analyze statistical data and data collection methods and use probability to make decisions.

### Course Goals

This course will help you meet these goals:

- Use trigonometry to derive the formula for the area of a triangle.
- Prove and apply the laws of Sines and Cosines.
- Identify cross sections for various three-dimensional objects.
- Solve systems of equations and inequalities.
- Graph inequalities with restrictions on the variable.
- Graph systems of inequalities.
- Solve problems using exponential and logarithmic functions.
- Transform functions on a coordinate plane.
- Find the inverse of a function.
- Make inferences based on statistical data.
- Solve for probabilities in complex situations and use probability to make complex decisions.
- Analyze and compare statistical models and data-collection methods.

### 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.
- Perform online research using various search engines and library databases.
- 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

Integrated Math 3B is a 0.5-credit course.

## Course Materials

- Notebook
- Computer with Internet connection and speakers or headphones
- Microsoft Word or equivalent
- 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: Geometry and Trigonometry

### Summary

In this unit, you will derive the trigonometric formula for the area of a triangle. You will prove and apply trigonometric laws. You will also explore various cross sections of three-dimensional figures and learn about density and displacement in geometric figures.

Day	Activity/Objective	Type
1 day: 1	<b>Syllabus and Plato Student Orientation</b> <i>Review the Plato Student Orientation and Course Syllabus at the beginning of this course.</i>	Course Orientation
3 days: 2–4	<b>Trigonometry and the Area of a Triangle</b> <i>Derive the formula <math>A = 1/2 ab \sin(C)</math> for the area of a triangle by drawing an auxiliary line from a vertex perpendicular to the opposite side.</i>	Course Activity
2 days: 5–6	<b>Proving the Laws of Sines and Cosines</b> <i>Prove the Laws of Sines and Cosines and use them to solve problems.</i>	Lesson
2 days: 7–8	<b>Applying the Laws of Sines and Cosines</b> <i>Understand and apply the Laws of Sines and Cosines to find unknown measurements in right and non-right triangles.</i>	Lesson

3 days: 9–11	<b>Cross Sections of Three-Dimensional Objects</b> <i>Identify the shapes of two-dimensional cross sections of three-dimensional objects and identify three-dimensional objects generated by rotations of two-dimensional objects.</i>	Lesson
3 days: 12–14	<b>Density and Displacement</b> <i>Learn about and use density and displacement along with geometric shapes.</i>	Course Activity
3 days: 15–17	<b>Unit Activity/Threaded Discussion—Unit 1</b>	Unit Activity
1 day: 18	<b>Posttest—Unit 1</b>	Assessment

## Unit 2: Modeling with Functions

### Summary

In this unit, you will create and solve equations. You will then explore various methods for solving systems of equations and inequalities.

Day	Activity/Objective	Type
2 days: 19–20	<b>Creating and Solving Equations</b> <i>Create equations to represent situations and solve them to work out problems in context.</i>	Lesson
2 days: 21–22	<b>Rewriting Formulas</b> <i>Rewrite equations to solve for a single variable.</i>	Lesson
3 days: 23–25	<b>Solving Linear Systems of Equations: Graphs</b> <i>Use the graphing method to solve systems of two linear equations.</i>	Lesson
2 days: 26–27	<b>Classifying Linear Systems</b> <i>Classify a system of linear equations as parallel, intersecting, or coincident.</i>	Lesson
3 days: 28–30	<b>Solving Linear Systems of Inequalities: Graphs</b> <i>Solve a system of inequalities by graphing.</i>	Lesson
3 days: 31–33	<b>Solving Linear Systems of Equations: Substitution</b> <i>Solve a system of equations by substitution.</i>	Lesson
2 days: 34–35	<b>Estimating Solutions for a System of Equations</b> <i>Study how the graphs of equations relate to the solution of a system of equations and explore multiple methods of approximation for a system of equations.</i>	Lesson
3 days: 36–38	<b>Unit Activity/Threaded Discussion—Unit 2</b>	Unit Activity
1 day: 39	<b>Posttest—Unit 2</b>	Assessment

## Unit 3: Graphing with Functions

### Summary

In this unit, you will graph various types of equations and inequalities. You will also perform operations on functions, transform functions, and find inverse functions.

Day	Activity/Objective	Type
2 days: 40–41	<b>Graphing Linear Inequalities in 1 Variable</b> <i>Graph the solution sets to inequalities in one variable.</i>	Lesson
2 days: 42–43	<b>Graphing with Restrictions on the Variable</b> <i>Graph the solution sets to absolute value inequalities in one variable.</i>	Lesson
2 days: 44–45	<b>Graphing Solution Sets of Associated Inequalities</b> <i>Graph the solution sets of quadratic inequalities in one variable and other unions of solution sets.</i>	Lesson
2 days: 46–47	<b>Operations on Functions</b> <i>Add, subtract, multiply, and divide pairs of functions.</i>	Offline
3 days: 48–50	<b>Solving Problems: Exponential and Logarithmic</b> <i>Solve problems that involve exponential or logarithmic functions.</i>	Lesson
2 days: 51–52	<b>Graphing Exponential and Logarithmic Functions</b> <i>Graph exponential and logarithmic functions and identify key features of those functions.</i>	Lesson
3 days: 53–55	<b>Transformation of Functions</b> <i>Investigate transformations of functions.</i>	Lesson
3 days: 56–58	<b>Inverse Functions</b> <i>Study and apply the method for finding the inverse of a function.</i>	Lesson
3 days: 59–61	<b>Unit Activity/Threaded Discussion—Unit 3</b>	Unit Activity
1 day: 62	<b>Posttest—Unit 3</b>	Assessment

## Unit 4: Inferences and Conclusions from Data

### Summary

In this unit, you will analyze data sets and fit them to normal distribution curves using mean and standard deviation. You will make inferences from statistical data and by questioning the validity of statistical models, and you will explore the use of statistics and different data collection methods. The unit includes calculating probabilities in complex situations.

Day	Activity/Objective	Type
3 days: 63–65	<b>Normal Distributions</b> <i>Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages.</i>	Lesson
3 days: 66–68	<b>Making Inferences Based on Statistics</b> <i>Understand statistics as a process for making inferences about population parameters based on a random sample from that population.</i>	Lesson
2 days: 69–70	<b>Evaluating the Validity of a Statistical Model</b> <i>Decide if a specified model (such as a simulation) is consistent with results from a given data-generating process.</i>	Lesson
2 days: 71–72	<b>Using Statistics in Surveys, Experiments, and Studies</b> <i>Recognize the purposes of and differences among sample surveys, experiments, and observational studies.</i>	Lesson
2 days: 73–74	<b>Analyzing a Survey</b> <i>Use data from a sample survey to estimate a population mean or proportion and develop a margin of error through the use of simulation models for random sampling.</i>	Lesson
3 days: 75–77	<b>Fair Decisions with Random Variables</b> <i>Solve for probabilities in complex situations that go beyond counting rules and use these probabilities to make fair decisions.</i>	Lesson
2 days: 78–79	<b>Evaluating Reports Based on Data</b> <i>Evaluate reports based on data.</i>	Lesson
2 days: 80–81	<b>Statistically Comparing Two Treatments</b> <i>Use data from a randomized experiment to compare two treatments and use simulations to decide if differences between parameters are significant.</i>	Lesson
3 days: 82–84	<b>Complex Decisions Using Probability</b> <i>Analyze decisions and strategies in complex situations using probability concepts that go beyond counting rules.</i>	Lesson
3 days: 85–87	<b>Unit Activity/Threaded Discussion—Unit 4</b>	Unit Activity
1 day: 88	<b>Posttest—Unit 4</b>	Assessment
1 day: 89	<b>Semester Review</b>	
1 day: 90	<b>End-of-Semester Test</b>	Assessment