Preview: MAT1050 : College Algebra

Syllabus

Course Overview

Learners in this course evaluate and perform linear, exponential, logarithmic, and other mathematical functions that include algebraic, graphic, and numeric properties. Learners then apply these concepts to the social and natural sciences, business, and everyday life.

Course Competencies   (Read Only)

To successfully complete this course, you will be expected to:

1. Perform mathematical functions involving real and complex numbers.

2. Apply mathematical concepts to linear equations and applications.

3. Apply mathematical concepts to algebraic expressions and functions.

4. Apply mathematical concepts to non-linear equations and applications.

5. Apply mathematical concepts to the social and natural sciences, business, and everyday life.

Course Prerequisites

There are no prerequisites for this course.

Syllabus >> Course Materials

Required

The materials listed below are required to complete the learning activities in this course.

Integrated Materials

Many of your required books are available via the VitalSource Bookshelf link in the courseroom, located in your Course Tools. Registered learners in a Resource Kit program can access these materials using the courseroom link on the Friday before the course start date. Some materials are available only in hard-copy format or by using an access code. For these materials, you will receive an email with further instructions for access. Visit the Course Materials page on Campus for more information.

Book

Lial, M. L., Hornsby, J., & McGinnis, T. (2016). *Algebra for college students with MyLab Math for algebra for college students* (8th ed.). Boston, MA: Pearson. ISBN: 9780135676493

External Resource

Please note that URLs change frequently. While the URLs were current when this course was designed, some may no longer be valid. If you cannot access a specific link, contact your instructor for an alternative URL. Permissions for the following links have been either granted or deemed appropriate for educational use at the time of course publication.

- Pearson Education. (n.d.). MyLab. Retrieved from www.pearsonmylabandmastering.com

Suggested

The following materials are recommended to provide you with a better understanding of the topics in this course. These materials are not required to complete the course, but they are aligned to course activities and assessments and are highly recommended for your use.

Optional

The following optional materials are offered to provide you with a better understanding of the topics in this course. These materials are not required to complete the course.

Unit 1 ›› Real Numbers and Linear Equations

Introduction

You stop at the grocery store to buy a few vegetables for tonight's dinner. You buy four red peppers priced at $.99 each, two large onions for $1.29 each, and a bag of Yukon gold potatoes that are normally $4.99 but are discounted 20%. How would you calculate the total cost of your items?

The rules that determine how to calculate the elements of a mathematical expression are called the order of operations. Computers and calculators use the order of operations to perform computations, and understanding how the order of operations works can also be helpful when creating spreadsheet formulas. This week's activities will show you how to use the order of operations to calculate equations, a skill you will apply as you learn the equations and functions of algebra throughout this course.

This week you will:

- **Discussion:** Consider how algebra affects your everyday life.

- **Assignment:** Complete your [MyLab](#) Math homework.
- **Planning:** Read about the Algebra in the Real World paper due in Week 8 to be sure you understand the assignment requirements.

Learning Activities

u01s1 - Discussion Overview / Assignment Overview

Discussion Overview

In this week's discussion post, you will consider the importance of algebra to you in your everyday life. Why are you being asked to take this algebra course? How will you use this information in your everyday life? In which areas of your life might algebraic equations already be at work?

Assignment Overview

This week we are covering what algebra is and how to use real numbers in calculations. You will practice the skills introduced this week using MyLab Math, and later, in Week 3, you will be tested on your knowledge in the first quiz.

u01s2 - What You Need to Know

Different Types of Numbers

Before we start talking about solving everyday mathematics problems, we need to understand the different types of numbers you will be using. The types of numbers used in an equation could have an influence on the outcome.

To learn more about the types of numbers you will use in this course, read the following from Chapter R, "Review the Real Number System," in your *Algebra for College Students* text:

- Sections R.1–R.4, pages 1–37. In these sections, you will be focusing on basic concepts of algebra, operations of real numbers, exponents, roots, order of operations, and properties of real numbers.

Solving problems

There are specific ways to solve problems correctly. Because complex problems often involve a combination of operations—for example, adding or dividing—in one equation, it is important to resolve these operations in the correct order. If you do not pay close attention to the order of operations, you will not find the correct solution. For example, in order to calculate the cost of buying vegetables in the produce aisle at the grocery store, you must multiply the number of a vegetable (such as heads of broccoli) by the price before adding to the total.

As another example, if you want to split a bill with four friends for $40 worth of items after a 5.5% tax. You would use the order of operations on the expression to get $10.55:

- (40 + 40 X 0.055) / 4 = $10.55

In the following video, watch your instructor walk you through the order of operations to solve problems:

- [Order of Operations](#).

For more about the order of operations in relation to linear equations, read the following from Chapter 1, "Linear Equations, Inequalities, and Applications," in your *Algebra for College Students* text:

- Section 1.1, pages 44–50. In this section, you will explore linear equations in one variable.

u01s2 - Learning Components

- Study the real number system.
- Study linear equations, inequalities, and applications.

u01s3 - Prepare for Your Course Paper: Algebra in the Real World

The Week 8 assignment, Algebra in the Real World, is a paper designed to give you an opportunity to think about how the course concepts apply to your personal life or to your professional discipline, such as business, health care, technology, or science.

Activities throughout the course are set up to help you prepare for the paper. As you go through the course, think about how the concepts and equations to which you are introduced can be used in real life. At this time, take a moment to read through the Algebra in the Real World assignment description and scoring guide in Week 8 to ensure that you understand the requirements. You might

also consider previewing activities in Weeks 3, 4, 6, 7, 8 and 10 to get more context for the types of equations in this assignment.

u01d1 - Write Your Discussion Post

Your course paper assignment due in Week 8 is about how algebra affects your life in tangible ways. Begin preparing yourself for this assignment by thinking about the importance of algebra to you and in your everyday life.

Answer the following questions in your discussion post:

- Why are you being asked to take this algebra course?
- How will you use what you learn in this course in your everyday life?

Response Guidelines

Read the posts of your peers and respond to any two posts. Consider the following questions in your replies:

- How similar are your thoughts to those of your peers about the purpose of algebra?
- What benefits of algebra did you identify that your peers did not?

Course Resources
Undergraduate Discussion Participation Scoring Guide

u01d1 - Learning Components

- Discuss relevance of algebra to daily life.

u01a1 - Unit 1 Homework

Assignment Introduction

You will do your homework each week through MyLab Math. To register, use the access code and instructions bundled with your VitalSource eBook.

The MyLab Math Learner Guide [PDF] will help you register, log into, navigate, and use the lab. At this time, review the guide, register and sign in, and make sure you have access to the **Homework, Quizzes, and Final** link. This link takes you to your homework for each week, all three quizzes, and the final exam.

Following are a few items to note when working on your homework assignments:

- The types of problems you will get include multiple choice, fill in the blank, true or false, and problem completion.
- Some of the problems have animations and videos attached to them that will help you figure out how to complete that specific type of problem. It is recommended that you use these tools.
- You are able to move from one problem to another as you wish. This can be done by using the navigation tools right above the actual problem.
- Once you answer a problem correctly, you are able to see a small green check mark next to the number of the problem.
- You are able to save your work at any time by clicking the **Save** button at the bottom of the problem box.
- You are able to access and complete each problem as many times as you would like to practice and improve your overall grade for the homework.

Assignment Instructions

Follow these steps to get into MyLab Math and access the homework. If you need additional help accessing and using MyLab Math, refer to the MyLab Math Learner Guide [PDF].

- Sign into MyLab, and click the **Homework, Quizzes, and Final** link.
- When you get to the list of homework assignments for the course, select **Unit 1 Homework**. This will take you to the **Homework Overview** page.
- Complete problems 1–54. Click a problem number to begin.

Once you have completed your work to your personal satisfaction, in the submission text box in the assignment area, **write a note to your instructor stating you have completed the MyLab Math homework**, and submit the note. At that time, the grade that you have in MyLab Math will be entered in the courseroom as your final homework activity grade.

Remember that all activities, including homework, are due by the close of the week or as directed by your instructor.

Unit 2 ›› Applications Involving Linear Equations

Introduction

Say you are buying a pair of shoes and you want to know how much the sales tax will be. The shoes are $60 and the local sales tax is 7%. How could you construct an algebraic equation to find the amount of tax?

There are many situations in everyday life that change in a consistent manner. One might say these changes happen at a *fixed rate*. These situations can be described by using linear equations. This week introduces linear equations and the methods used to solve and apply them.

This week you will:

- **Discussion:** Share a formula and discuss how it is used in your life or a professional field.
- **Assignment:** Complete your [MyLab](#) Math homework.

Learning Activities

u02s1 - Discussion Overview / Assignment Overview

Discussion Overview

This week's discussion continues to explore how algebra affects your life in tangible ways. Review sections R.1–R.4 and 1.1–1.7 in your *Algebra for College Students* text. As you review this information, think about how some of the formulas that were presented to you can show up in business, health care, technology, science, or your life.

Assignment Overview

This week we are studying linear equations. You will practice the skills introduced this week using MyLab Math and will be tested on your knowledge in the quiz coming up in Week 3.

u02s2 - What You Need to Know

Linear equations are the building blocks to many aspects of algebra. They can help with calculations we often encounter in everyday life, including doing our taxes, deciding on how much of a tip to give at a restaurant, and calculating sales tax.

For example:

If you are aware that a 7% tax on an item is $4.20, you can find the original price, *p,* using this equation:

$0.07p = 4.20$

$p = 4.20/0.07 = \$60$

In the following video, watch your instructor walk you through how to solve a linear equation:

- [Application Linear Equations](#).

To learn more about linear equations, read the following from Chapter 1, "Linear Equations, Inequalities, and Applications," in your *Algebra for College Students* text:

- Sections 1.2–1.7, pages 54–118. The topics of these sections include creating and solving linear equations in one variable, introducing and using formulas, and learning applications of linear equations. As you go through these sections, think about how these concepts can be used in the real world in the fields of health care, technology, business, and/or science.

u02s2 - Learning Components

- Study linear equations, graphs, and functions.
- Study systems of linear equations.

u02d1 - Write Your Discussion Post

Review sections R.1–R.4 and 1.1–1.7 in your *Algebra for College Students* text. As you review this information, think about how some of the formulas that were presented to you can show up in your life

or in the fields of business, health care, technology, or science. Feel free to also search the Internet for additional examples.

For this discussion, post a real-life formula, and explain how it is used in your life or in the field of business, health care, technology, or science.

Response Guidelines

Read the posts of your peers and respond to two. Evaluate the scenario and formula that each peer identified, and respond to the following:

- Does this situation apply in your life? Explain.
  - If the situation does apply in your life, does the formula also fit for you? Explain.
  - If not, explain why you do not use it.
- What is your reaction to and impression of the situation and formula your peer identified? Explain.

Course Resources
Undergraduate Discussion Participation Scoring Guide

u02d1 - Learning Components

- Discuss how a real-life formula is used in everyday life or in business.

u02a1 - Unit 2 Homework

Assignment Introduction

This homework assignment will help you practice the skills you learned this week.

Assignment Instructions

Sign into MyLab, and go to **Unit 2 Homework** in the **Homework, Quizzes, and Final** link. Complete problems 1–46.

As a reminder, if you need additional help accessing and navigating through MyLab Math, use the MyLab Math Learner Guide [PDF].

Once you have completed your work to your personal satisfaction, in the submission text box in the assignment area, **write a note to your instructor stating you have completed the MyLab Math homework**, and submit the note. At that time, the grade that you have in MyLab Math will be entered in the courseroom as your final homework activity grade.

Remember that all activities, including homework, are due by the close of the week or as directed by your instructor.

Unit 3 ≫ Linear Equations and Inequalities in Two Variables

Introduction

You are the great Willy Wonka, and you are working on developing a new chocolate peanut butter bar. In order to perfect the taste of the chocolate, you must warm it to just the right temperature. The problem is that the temperature in your recipe is listed in Celsius, and you need the degrees in Fahrenheit. What formula would you use to convert the Celsius temperature to Fahrenheit?

The saying goes, "a picture is worth a thousand words." Pictures contain a lot of information. In mathematics, pictures are graphs. Graphs can present large amounts of information in a compact and easily understood format. So it is not hard to understand why most business presentations include graphs. It is important to understand how to create, read, and use graphs, as you will do in this week's learning activities.

This week you will:

- **Quiz:** Take your first quiz of this course, covering concepts from Weeks 1–3.
- **Assignment:** Complete your [MyLab](#) Math homework.

Learning Activities

u03s1 - Assignment Overview / Discussion Overview / Quiz Overview

Discussion Overview

There is no required discussion post this week. However, there is an optional discussion thread where you can feel free to discuss the course material from this week, ask questions, or share insights.

Assignment Overview

This week we are continuing our study of linear equations, focusing on equations with one variable. You will practice the skills introduced this week using MyLab Math and will be tested on your knowledge in this week's quiz.

Quiz Overview

You will complete the first quiz of the course this week. The quiz covers the material in Weeks 1–3.

u03s2 - What You Need to Know

Last week you learned how to solve linear equations with one variable. This week you will learn how to solve linear equations with two variables and how to graph equations. These kinds of equations have many practical applications, such as converting Celsius temperatures to Fahrenheit or vice versa.

For example, if you convert Celsius, C, to Fahrenheit, F, you use the linear equation $F = 9/5C + 32$.

In the following video, watch your instructor walk you through graphing a line by plotting points:

- [Graphing a Line](#).

To learn about linear equations and graphing, read the following from Chapter 2, "Linear Equations, Graphs, and Functions," in your *Algebra for College Students* text:

- Sections 2.1–2.6, pages 136–201. In these sections, you will be focusing on the rectangular coordinate system (also known as the Cartesian coordinate system), the slope of a line, and linear equations and inequalities in two variables.

To learn about linear systems and graphing two equations, read the following from Chapter 3, "Systems of Linear Equations," in your *Algebra for College Students* text. As you go through each

section, try to identify ways the concepts presented may be applied to real-world situations in health care, technology, business, and/or science.

- Section 3.1, pages 216–225. In this section, you will learn about systems of linear equations in two variables. You will be introduced to methods that can be used to solve linear systems. You can find solutions by using ordered pairs, by graphing two equations with two variables, and by using the method of substitution.
- Section 3.3, pages 240–250. The focus of this section is on the applications of systems of linear equations.

u03s2 - Learning Components

- Study the Cartesian coordinate system, the slope of a line, and linear equations and inequalities in two variables.
- Study methods that can be used to solve linear systems and applications for systems of linear equations.

u03d1 - Ask Your Classmates

You are not required to submit any discussion posts this week, but feel free to ask questions or share insights related to the course material.

As always, feel free to contact your instructor directly with any specific questions or concerns.

u03a1 - Unit 3 Homework

Assignment Introduction

This homework assignment will help you practice the skills you learned this week.

Assignment Instructions

Sign into [MyLab](), and go to **Unit 3 Homework** in the **Homework, Quizzes, and Final** link. Complete problems 1–50.

As a reminder, if you need additional help accessing and using MyLab Math, refer to the [MyLab Math Learner Guide [PDF]]().

Once you have completed your work to your personal satisfaction, in the submission text box in the assignment area, **write a note to your instructor stating you have completed the MyLab Math homework**, and submit the note. At that time, the grade that you have in MyLab Math will be entered in the courseroom as your final homework activity grade.

Remember that all activities, including homework, are due by the close of the week or as directed by your instructor.

u03a2 - Quiz 1

This quiz covers the material you learned in Weeks 1–3. It is recommended that you take the quiz after completing this week's homework.

You have been able to practice the skills from Weeks 1, 2, and 3 through the homework assignments and discussions. Now it is time to assess those skills.

To access the quiz:

1. Sign into [MyLab](), and go to the **Homework, Quizzes, and Final** link.
2. Select **Quiz 1 (Units 1, 2, 3)**, which is located in the middle of the page.
3. Prior to starting, make sure you read the instructions and reminders located on the **Are you ready to start** page.
4. Once you are ready to actually start the quiz, click **I am ready to start,** which is located on the right-hand side of the page.

As a reminder:

- You have two chances to take the quiz (the higher score counts). Make sure you are prepared prior to starting the quiz.
- There is a 120-minute time limit for the quiz.
- You must answer all of the questions within one session; you cannot log out of the quiz in the middle of taking it and then go back in later to finish it.

- Once you have submitted the quiz, your grade is recorded. You will be brought to a screen on which you can see your grade and the results of each quiz question.

If you have any issues or questions, contact your instructor.

Unit 4 ≫ Exponents, Polynomials, and Polynomial Functions

Introduction

You have been diligently saving for a new car and have decided to invest your money in a certificate of deposit. You start with $2000 and an annual interest rate of 3%. How would you calculate the future value of your investment?

While some everyday situations can be modeled with linear functions, many situations can only be modeled using nonlinear functions. To solve these equations, you will have to deal with exponents and polynomial functions. Arriving at a solution means that you understand how to simplify and solve these kinds of equations. This week you will explore these complex situations.

This week you will:

- **Discussion:** Explain the use of exponents in the real world.
- **Assignment:** Complete your [MyLab](#) Math homework.

Learning Activities

u04s1 - Discussion Overview / Assignment Overview

Discussion Overview

In this week's discussion, you will share and explain an example of how exponents are used in the real world.

Assignment Overview

This week we are exploring exponents and their applications. You will practice the skills introduced this week using the MyLab Math site and will be tested on your knowledge in the Week 6 quiz.

u04s2 - What You Need to Know

This week you will study exponents, which involve repeatedly multiplying a number by itself. Exponents are often used in household tasks that require calculating area and volume. Exponents are also common in banking.

For example:

If you decide to put $2000 in a certificate of deposit (CD) at the bank compounded monthly for two years at 3% annual interest, your future value should be:

[CP: Please insert inline image of equation here, it's saved in "u04s2 equation.tif" in the course files]

In the following video, watch your instructor walk you through exponent calculations:

- [Negative Exponents](#).

To learn more about exponents, read the following from Chapter 4, "Exponents, Polynomials, and Polynomial Functions," in your *Algebra for College Students* text:

- Section 4.1, pages 266–275. This section introduces the concept of integer exponents. You will use these topics to solve application problems.
- Section 4.2, pages 281–284. The focus of this section is on adding and subtracting polynomials.
- Section 4.3, pages 286–293. The focus of this section is to treat polynomials as functions.
- Section 4.4, pages 298–305. The focus of this section is on multiplying polynomials.
- Section 4.5, pages 307–311. This section is on dividing polynomials.

Sections 4.2, 4.4, and 4.5 expand your experience working with polynomials and introduce methods for defining the degree of a polynomial and for applying addition, subtraction, multiplication, and division functions. As you go through these sections, think about the purpose of being able to add, subtract, multiply, and divide polynomials. How does this information apply to real-world situations in health care, technology, business, or science?

u04s2 - Learning Components

- Consider the applications of polynomials functions to real-world situations in health care, technology, business, or science.
- Study exponents, polynomials, and polynomial functions.

u04d1 - Write Your Discussion Post

Using the information you learned in the chapters you read this week, find a real-life example where exponents are used in business, the natural sciences, the arts, or the social sciences. Explain their use.

Response Guidelines

Read the posts of your peers and respond to any two of the posts. Consider examples your peers selected. What additional comments, suggestions, or questions do you have about your peers' choices?

Course Resources
Undergraduate Discussion Participation Scoring Guide

u04d1 - Learning Components

- Discuss specific ways that algebra can be applied to business, natural science, and social science.

u04a1 - Unit 4 Homework

Assignment Introduction

This homework assignment will help you practice the skills you learned this week.

Assignment Instructions

Sign into [MyLab](#), and go to **Unit 4 Homework** in the **Homework, Quizzes, and Final** link. Complete problems 1–47.

As a reminder, if you need additional help accessing and using MyLab Math, refer to the [MyLab Math Learner Guide [PDF]](#).

Once you have completed your work to your personal satisfaction, in the submission text box in the assignment area, **write a note to your instructor stating you have completed the MyLab Math homework**, and submit the note. At that time, the grade that you have in MyLab Math will be entered in the courseroom as your final homework activity grade.

Remember that all activities, including homework, are due by the close of the week or as directed by your instructor.

Unit 5 ≫ Factoring

Introduction

You are raising funds for an annual charity concert and need to know how much revenue to expect if you increase the ticket price of last year's event. How would you calculate the maximum revenue you can earn from ticket sales?

Equations involving polynomials may have more than one solution. To find the set of possible solutions, we need to break down the polynomial into its factors and apply specific properties to resolve each factor. This week you will study how to find the factors in a polynomial and how to use them to resolve the equations.

This week you will:

- **Assignment:** Complete your [MyLab](#) Math homework.
- **Planning:** Begin compiling ideas for your Algebra in the Real World paper, due in Week 8.

Learning Activities

u05s1 - Discussion Overview / Assignment Overview

Discussion Overview

There is no required discussion post this week. However, there is an optional discussion thread where you can feel free to discuss the course material from this week, ask questions, or share insights.

Assignment Overview

This week we are studying factoring, a technique that can be used to simplify complicated equations. You will practice the skills introduced this week using MyLab Math and will be tested on your knowledge in the Week 6 quiz.

u05s2 - What You Need to Know

Factoring is a technique that can be used to break down more complicated equations from applications into smaller, possibly more manageable components.

For example:

If you know that the average attendance at an event is 10,000 when the ticket price is $25, and for each $2 increase in price you can expect a decrease of 100 attendees, then the expression $(25 + 2x)$ $(10000 - 100x)$ may be used to determine maximum revenue.

In the following video, watch your instructor explain a general strategy for factoring:

- [General Factoring](#).

To learn more about factoring, read the following from Chapter 5, "Factoring," in your *Algebra for College Students* text:

- Sections 5.1–5.5, pages 324–355. The topics of these sections include factoring out the greatest common factor by grouping, factoring trinomials, solving equations by factoring, and identifying a general approach to factoring. In addition, you will look at factoring special cases. You will use this skill in later sections to resolve everyday problems.

Read the following from Chapter 6, "Rational Expressions and Functions," in your *Algebra for College Students* text:

- Section 6.1, pages 366–373. The topics of this section include reducing rational expressions by factoring and also multiplication and division of rational expressions.

u05s2 - Learning Components

- Study approaches to factoring.
- Study approaches to multiplication and division of rational expressions, and reducing rational expressions by factoring.

u05s3 - Prepare for Your Course Paper: Algebra in the Real World

Throughout the course, you are prompted to consider how algebra relates to many everyday situations. The Algebra in the Real World assignment in Week 8 is designed to give you an opportunity to think about how the course concepts apply to your everyday life. You may apply these to your personal experiences, or you may apply them specifically to your discipline, such as health care, technology, or business.

Prepare for the assignment by reviewing the assignment instructions and scoring guide and reflecting on your discussion board posts to compile ideas for your paper.

u05d1 - Ask Your Classmates

You are not required to submit any discussion posts this week, but feel free to ask questions or share insights related to the course material.

As always, feel free to contact your instructor directly with any specific questions or concerns.

u05a1 - Unit 5 Homework

Assignment Introduction

This homework assignment will help you practice the skills you learned this week.

Assignment Instructions

Sign into [MyLab](#), and go to **Unit 5 Homework** in the **Homework, Quizzes, and Final** link. Complete problems 1–44.

As a reminder, if you need additional help accessing and using MyLab Math, refer to the [MyLab Math Learner Guide [PDF]](#).

Once you have completed your work to your personal satisfaction, in the submission text box in the assignment area, **write a note to your instructor stating you have completed the MyLab Math homework**, and submit the note. At that time, the grade that you have in MyLab Math will be entered in the courseroom as your final homework activity grade.

Remember that all activities, including homework, are due by the close of the week or as directed by your instructor.

Unit 6 ❯❯ Root Expressions and Equations Involving Rational Expressions

Introduction

Say you have a really big printing job. You have one printer that can complete the job in 12 hours and a second, newer printer that can finish the same job in 8 hours. What sort of algebraic equation could you use to determine how long it would take to print everything if both printers are going at the same time?

Up to this point, you may notice that a common theme every week is learning to apply the course concepts to everyday life, to business, and to science. Unlike many math courses that you may have taken, this course takes the philosophy that your understanding of math is not complete unless you understand why you are learning it and how it can be applied. Consider how many times you have heard, "You will never use this [type of math] again after this class is done." It is hoped that after you take this course, you will use these concepts and understand how they apply in real-world situations.

In addition to general application, the activities this week take your skills in working with polynomials one step further by extending to rational expressions. Rational expressions are the elements of the set {P divided by Q where P and Q are polynomials and Q is not equal to 0}.

This week you will:

- **Assignment:** Complete your [MyLab](#) Math homework.
- **Quiz:** Take your second quiz of this course, covering concepts from Weeks 4–6.

Learning Activities

u06s1 - Discussion Overview / Assignment Overview / Quiz Overview

Discussion Overview

This week's discussion is optional. You may use this opportunity to discuss course concepts and assignments with your fellow learners.

Assignment Overview

This week, we explore root expressions and equations involving rational expressions. This homework assignment will help you practice skills involving these concepts.

Quiz Overview

You will complete the second quiz of the course this week. This quiz covers the material from Weeks 4–6.

u06s2 - What You Need to Know

Rational expressions in equations can be used to understand the impact on time when multiple people or machines work together. For example, if you have a large printing job and one printer can complete the job in 12 hours, and a newer printer can complete the same job in 8 hours, then working together they can complete the job in *t* hours, where:

(1/12) *t* + (1/8) *t* = 1
2*t* + 3*t* = 24
5*t* = 24
t = 24/5 = 4.8 hours

In the following video, watch your instructor demonstrate solving an equation with rational expressions:

- [Equation with Rational Expressions](#).

To learn more about rational expressions, read the following from Chapter 6, "Rational Expressions and Functions," in your *Algebra for College Students* text:

- Section 6.2, pages 376–382.
- Sections 6.4–6.5, pages 391–406.

These sections focus on the concepts of rational functions. Initially, this topic may seem purely academic, but there are a variety of economic equations and models, such as a standard cost-benefit analysis, that make use of rational functions.

To learn more about root functions and radical expressions, read the following from Chapter 7, "Roots, Radicals, and Root Functions," in your *Algebra for College Students* text:

- Sections 7.1–7.3, pages 434–458. The first three sections of this chapter look at radical expressions, graphs, rational exponents, and simplifying radical expressions. Radical expressions deal with finding roots of numbers as well as finding the principle of the roots. An example of where these concepts can be used is in electronics. As you work through the rational exponents and simplifying radical expressions, think about where they can be used in the real world.

u06d1 - Ask Your Classmates

You are not required to submit any discussion posts this week, but feel free to ask questions or share insights related to the course material.

As always, feel free to contact your instructor directly with any specific questions or concerns.

u06a1 - Unit 6 Homework

Assignment Introduction

This homework assignment will help you practice the skills you learned this week.

Assignment Instructions

Sign into MyLab, and go to **Unit 6 Homework** in the **Homework, Quizzes, and Final** link. Complete problems 1–34.

As a reminder, if you need additional help accessing and using MyLab Math, refer to the MyLab Math Learner Guide [PDF].

Once you have completed your work to your personal satisfaction, in the submission text box in the assignment area, **write a note to your instructor stating you have completed the MyLab Math homework**, and submit the note. At that time, the grade that you have in MyLab Math will be entered in the courseroom as your final homework activity grade.

Remember that all activities, including homework, are due by the close of the week or as directed by your instructor.

u06a2 - Quiz 2

This quiz will be for the material you learned in Weeks 4–6.

You have been able to practice the skills from Weeks 4, 5, and 6 through the homework assignments and discussions. Now it is time to assess those skills.

To access the quiz:

1. Sign into MyLab, and go to the **Homework, Quizzes, and Final** link.
2. Click **Quiz 2 (Units 4, 5, 6)**, which is located in the middle of the page.
3. Prior to starting, make sure you read the instructions and reminders located on the **Are you ready to start** page.
4. Once you are ready to actually start the quiz, click **I am ready to start**, which is located on the right-hand side of the page.

As a reminder:

- You have two chances to take the quiz (higher score counts). Make sure you are prepared prior to starting the quiz.
- There is a 120-minute time limit for the quiz.
- You must answer all of the questions within one session; you cannot log out of the quiz in the middle of taking it and then go back in later to finish it.
- Once you have submitted the quiz, your grade is recorded. You will be brought to a screen on which you can see your grade and the results of each quiz question.

If you have any issues or questions, contact your instructor.

Unit 7 ≫ Complex Numbers and Equations Involving Root Expressions

Introduction

Say you are a contractor and you need to calculate the length of a board for a roof rafter. The length of the ceiling joist is 24 feet and the roof's peak is 9 feet. How would you construct the algebraic equation to determine the board's length?

At this time, you have been asked several times to relate algebra—and the concepts of algebra—to your life, business, and science. This week, you will work with equations involving roots expressions and also complex numbers. These types of problems are common in science applications—for example, when making geometric calculations and when studying physics.

This week you will:

- **Discussion:** Identify and reflect on an application of the Fibonacci sequence to the world around you.
- **Assignment:** Complete your [MyLab](#) Math homework.
- **Planning:** Continue working on your Algebra in the Real World paper, which is due next week.

Learning Activities

u07s1 - Discussion Overview / Assignment Overview

Discussion Overview

The paper due in Week 8 is about how algebra affects your life in tangible ways. In this week's discussion, you will be asked to reflect on the place of algebra in everyday life by researching and talking about how the Fibonacci sequence, a famous mathematical sequence, is found in art, music, architecture, or some other area.

Assignment Overview

This week, you will work with equations involving roots expressions and also complex numbers. You will practice the skills introduced this week using MyLab Math.

u07s2 - What You Need to Know

A root function can help locate the length of a rectangle's diagonal. If a contractor needs to cut a board to correct size for a rafter (ignoring overhang) with a ceiling joist of length 24 feet (use half = 12) and peak height 9 feet, he or she could use the root function to determine the length of the board:

[CP: Please insert inline image of equation here, it's saved in "U07s2 equation.png" in the course files]

Understanding how to conduct operations on complex numbers is an essential part of solving equations with roots, root functions, and radicals.

In the following video, watch your instructor demonstrate operations on complex numbers:

- [Complex Numbers](#).

Learn more about root functions and radicals by reading the following from Chapter 7, "Roots, Radicals, and Root Functions," in your *Algebra for College Students* text:

- Sections 7.4–7.7, pages 463–490.
  - The topics in the first three sections include adding, subtracting, multiplying, and dividing radical expressions and solving equations with radicals.
  - You will also learn more about simplifying radical expressions.
  - The FOIL method will be introduced as it relates to multiplying radicals.
  - The last section introduces complex numbers and operations involving complex numbers.
  - As you go through these sections, think about how these exercises and topics can apply to your everyday life, business, and science.

u07d1 - Write Your Discussion Post
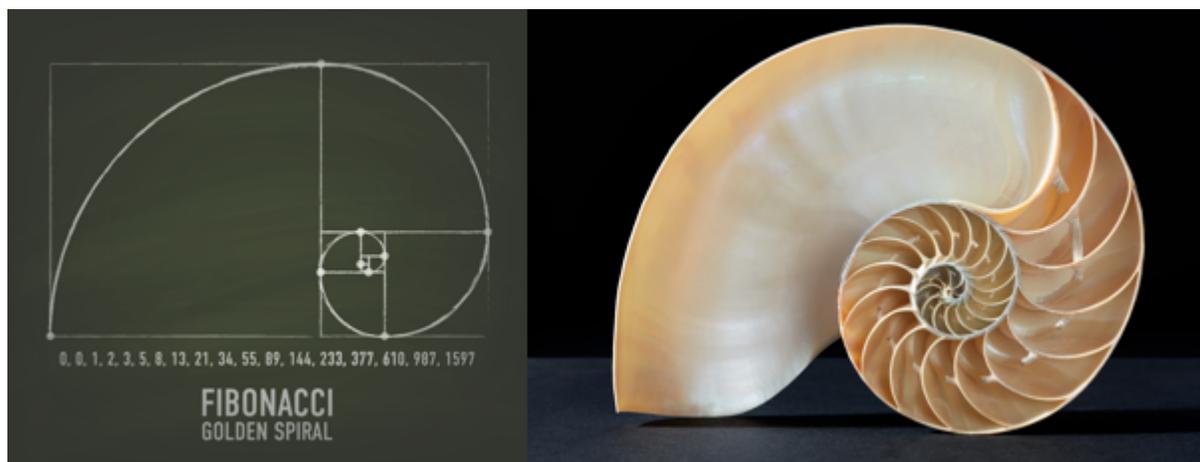
An Italian mathematician known as Fibonacci introduced a sequence of numbers that has been identified or applied to several contexts including nature, art, architecture, and music. For example, the Fibonacci sequence describes the proportions of the seashell above.

For this post, do some research to locate an application of the Fibonacci sequence, and discuss it. Complete the following steps:

- Define a sequence in general.
- Identify at least one way that the Fibonacci sequence has been found or applied to nature, art, architecture, and/or music. Explain how the example is related.

- Reflect on this application of the sequence and explain what surprised you the most about it. Is there a clear reason why the sequence appears to have been applied here?

The application of the Fibonacci sequence you discuss in this activity may serve as one of the examples you discuss in your Week 8 assignment, Algebra in the Real World.

Response Guidelines

Read the posts of your peers and respond to any two of the posts. Consider the following when you are responding to your peers:

- How did your example compare to those of your peers?
- What additional questions or comments do you have?

Course Resources
Undergraduate Discussion Participation Scoring Guide

u07a1 - Unit 7 Homework

Assignment Introduction

This homework assignment will help you practice the skills you learned this week.

Assignment Instructions

Sign into MyLab, and go to **Unit 7 Homework** in the **Homework, Quizzes, and Final** link. Complete problems 1–33.

As a reminder, if you need additional help accessing and using MyLab Math, refer to the MyLab Math Learner Guide [PDF].

Once you have completed your work to your personal satisfaction, in the submission text box in the assignment area, **write a note to your instructor stating you have completed the MyLab Math homework**, and submit the note. At that time, the grade that you have in MyLab Math will be entered in the courseroom as your final homework activity grade.

Remember that all activities, including homework, are due by the close of the week or as directed by your instructor.

u07s3 - Prepare for Your Course Paper: Algebra in the Real World

Throughout the course, you have learned how algebra relates to many everyday situations. The assignment due next week is designed to give you an opportunity to think about how the course concepts apply to your everyday life. You may apply these to your personal experiences, or you may apply them specifically to your discipline, such as health care, technology, or business.

Continue working on your paper this week. Refer to the Algebra in the Real World assignment description to ensure that you include all requirements and all grading criteria are addressed.

Unit 8 ≫ Quadratic Equations

Introduction

Say your friend Joe just purchased a farm and he needs to build a fence around the property. His property is shaped like a right triangle with an approximate 90° angle, but his land map only shows the lengths of two of the three sides. How could you use the quadratic equation to help Joe determine how much fencing he needs to buy?

This week, we will review additional properties that allow us to solve more complex problems involving square roots and quadratic equations. These problems can be used to describe common physical properties.

This week you will:

- **Homework Assignment:** Complete your [MyLab](#) Math homework.
- **Paper Assignment:** Complete your 2–4 page Algebra in the Real World course paper.

Learning Activities

u08s1 - Discussion Overview / Assignment Overview

Discussion Overview

This week's discussion activity is optional. You may use this opportunity to discuss course concepts and assignments with your fellow learners.

Assignment Overview

This week, you will explore quadratic equations and the application of algebra in the world around you. Two assignments this week give you the opportunity to work with these concepts:

1. MyLab Math homework.
2. Algebra in the Real World paper.

u08s2 - What You Need to Know

Let us revisit the fencing problem at your friend Joe's new triangular farm property. He knows that one side of his property is 35 feet and the other is 70 feet, but he does not know the length of the third side. Without the length of the third perimeter line of his land, Joe can use a quadratic equation to determine the amount of fencing he needs, like this:

[CP: Please insert inline image of equation here, it's saved in "U08s2 equation.png" in the course files]

Therefore, the total amount of fencing that Joe needs is 183.26 feet.

Learn more about quadratic equations by reading the following from Chapter 8, "Quadratic Equations and Inequalities," in your *Algebra for College Students* text:

- Sections 8.1–8.2, pages 504–518.
- Sections 8.4–8.5, pages 532–546.

In preceding chapters, the quadratic equations were chosen to be solved by the factoring method. In these sections and the following sections, you will learn methods to solve all quadratic equations and

quadratic inequalities. You will also learn how to apply the zero factor and square root properties.

In the following video, watch your instructor graph a parabola from a quadratic equation:

- [Graph a Parabola](#).

u08d1 - Ask Your Classmates

You are not required to submit any discussion posts this week, but feel free to ask questions or share insights related to the course material.

As always, feel free to contact your instructor directly with any specific questions or concerns.

u08a1 - Unit 8 Homework

Assignment Introduction

This homework assignment will help you practice the skills you learned this week.

Assignment Instructions

Sign into [MyLab](#), and go to **Unit 8 Homework** in the **Homework, Quizzes, and Final** link. Complete problems 1–25.

As a reminder, if you need additional help accessing and using MyLab Math, refer to the [MyLab Math Learner Guide [PDF]](#).

Once you have completed your work to your personal satisfaction, in the submission text box in the assignment area, **write a note to your instructor stating you have completed the MyLab Math homework**, and submit the note. At that time, the grade that you have in MyLab Math will be entered in the courseroom as your final homework activity grade.

Remember that all activities, including homework, are due by the close of the week or as directed by your instructor.

u08a2 - Algebra in the Real World

Assignment Overview

Throughout the course, you have learned how algebra relates to many everyday situations. This assignment is designed to give you an opportunity to think about how the course concepts apply to your life. You may apply them to your personal experiences, or you may apply them specifically to your discipline, such as health care, technology, or business.

For this assignment, you will gather ideas from the discussion boards, Internet, and textbook readings to create a clearly formatted paper and to incorporate additional insights and edits, as appropriate. Review/preview the types of equations covered in Weeks 3, 4, 6, 7, 8, and 10.

Assignment Instructions

In your paper, complete the following. Feel free to include equations and/or graphical representations.

1. Explain in mathematical terms equations that have applications in your personal or professional life.
   - Choose 4 equations or functions among those covered in the course, including one from each of the following:
     - Linear (Week 3).
     - Polynomial of degree > 2 (Week 4) or quadratic (Week 8).
     - Rational (Week 6) or radical (Week 7).
     - Logarithmic (Week 10) or exponential (Week 10).

2. Analyze how and where each equation is applicable to your personal or professional life.
   - Applications may include areas such as business, health care, technology, and/or science.
   - Pay particular attention to applications that impact your life.

3. Discuss the most surprising aspect of applying algebra to your personal or professional life.
   - After you identify the aspect, discuss specifically how this application is surprising, unexpected, or even delightful.

- Compare this aspect to other applications of algebra in personal or professional contexts.

Note that examples can run in the background of our lives without us directly plugging in numbers ourselves.

Before submitting your paper, read through the assignment scoring guide to ensure that you have met the requirements.

Assignment Requirements

Your paper should meet the following requirements:

- **Written communication:** Your writing is free of errors that detract from the overall message.
- **APA formatting:** Resources and citations are formatted according to APA style and format.
- **Paper length:** Write 2–4 pages. Be sure to address all the criteria in the scoring guide.
- **Paper structure:** Your paper should be set up in a logical format based on topics and include the following:
    - A title page.
    - Headers. (Consider including a header for each type of equation: Linear, Quadratic, and so on.)

Competencies Measured

The course competencies are measured through individual scoring guide criteria in each assignment. By successfully completing this assignment, you will demonstrate your proficiency in the following course competencies:

- **Competency 5: Apply mathematical concepts to the social and natural sciences, business, and everyday life.**
    - Explain linear equations in mathematical terms.
    - Explain polynomial or quadratic equations in mathematical terms.
    - Explain radical or rational equations in mathematical terms.
    - Explain logarithmic or exponential equations in mathematical terms.
    - Discuss the most surprising aspect of applying algebra to one's personal or professional life.

Unit 9 ≫ Functions and Relations

Introduction

Say you need to find a book, like your textbook. Starting in 1970, each edition of a book is assigned a 13-digit ISBN to identify it. How can an inverse function help you search for a book you need?

The activities this week expand on the concept of a function that was introduced in Week 3. Functions are all around us, from computing postage on a package to calculating taxes. In addition, this week you will explore how to *undo* a function by investigating the inverse of a function.

This week you will:

- **Assignment:** Complete your [MyLab](#) Math homework.
- **Quiz:** Take your third and final quiz of this course, covering concepts from Weeks 7–9.

Learning Activities

u09s1 - Discussion Overview / Assignment Overview / Quiz Overview

Discussion Overview

This week's discussion is optional. You may use this opportunity to discuss course concepts and assignments with your fellow learners.

Assignment Overview

This week, you will explore mathematical functions and relations. You will practice the skills introduced this week using the MyLab Math site.

Quiz Overview

You will complete the third quiz of the course this week. This quiz covers the material covered in Weeks 7–9.

u09s2 - What You Need to Know

Inverse functions can be useful when looking to find where the output of a function came from. For example, if you have the International Standard Book Number (ISBN) for a book, an inverse function can help you find it. When you use an Internet search for the ISBN, the search engine uses an inverse function to locate the book associated with that number.

In the following video, watch your instructor demonstrate the composition of functions:

- [Composition of Functions](#).

To learn more about functions and relations, read the following from Chapter 9, "Additional Graphs of Functions and Relations," in your *Algebra for College Students* text:

- Sections 9.1–9.2, pages 558–574, and Section 9.4, pages 589–597. These sections revisit the idea of a function and then expand the topics related to functions.

Then read the following from Chapter 10, "Inverse, Exponential, and Logarithmic Functions," in your *Algebra for College Students* text:

- Section 10.1, pages 618–623. This section describes conditions necessary for a function to have an inverse and then presents a few techniques used in finding inverse functions.

u09d1 - Ask Your Classmates

You are not required to submit any discussion posts this week, but feel free to ask questions or share insights related to the course material.

As always, feel free to contact your instructor directly with any specific questions or concerns.

u09a1 - Unit 9 Homework

Assignment Introduction

This homework assignment will help you practice the skills you learned this week.

Assignment Instructions

Sign into [MyLab](#), and go to **Unit 9 Homework** in the **Homework, Quizzes, and Final** link. Complete problems 1–24.

As a reminder, if you need additional help accessing and using MyLab Math, refer to the [MyLab Math Learner Guide \[PDF\]](#).

Once you have completed your work to your personal satisfaction, in the submission text box in the assignment area, **write a note to your instructor stating you have completed the MyLab Math homework**, and submit the note. At that time, the grade that you have in MyLab Math will be entered in the courseroom as your final homework activity grade.

Remember that all activities, including homework, are due by the close of the week or as directed by your instructor.

u09a2 - Quiz 3

This quiz will be for the material you learned in Weeks 7–9.

You have been able to practice the skills from Weeks 7, 8, and 9 through the homework assignments and discussions. Now it is time to assess those skills.

To access the quiz:

1. Sign into [MyLab](#), and go to the **Homework, Quizzes, and Final** link.
2. Click **Quiz 3 (Units 7, 8, 9)**, which is located in the middle of the page.
3. Prior to starting, make sure you read the instructions and reminders located on the **Are you ready to start** page.
4. Once you are ready to actually start the quiz, click **I am ready to start**, which is located on the right-hand side of the page.

As a reminder:

- You have two chances to take the quiz (higher score counts). Make sure you are prepared prior to starting the quiz.

- There is a 120-minute time limit for the quiz.
- You must answer all of the questions within one session; you cannot log out of the quiz in the middle of taking it and then go back in later to finish it.
- Once you have submitted the quiz, your grade is recorded. You will be brought to a screen on which you can see your grade and the results of each quiz question.

If you have any issues or questions, contact your instructor.

Unit 10 ≫ Exponential and Logarithmic Functions

Introduction

Say a friend of yours is undergoing some heart tests at the cardiologist. One procedure involves an injection of radioactive technetium-99m that helps the cardiologist map blood flow through the heart. If the half-life of technetium-99m is 6 hours, what algebraic equation will help you calculate how much of the isotope is still in your friend's body after 12 hours?

Exponential and logarithmic functions have many applications in the sciences as well as in business. The activities this week introduce the basic properties associated with exponential and logarithmic expressions and then use these concepts to investigate mathematical models. Applications this week include compound interest, population, and the pH value of a solution.

This week you will:

- **Assignment:** Complete your MyLab Math homework.
- **Final Exam:** Complete your final exam for this course.
- **Discussion:** Reflect on what you learned in this course and how it applies to your life.

Learning Activities

u10s1 - Assignment Overview / Exam Overview / Discussion Overview

Assignment Overview

This week, you will explore exponential and logarithmic functions. The homework assignment will help you practice the skills you learned.

Exam Overview

You will complete the final exam quiz this week. This covers all the material in course.

Discussion Overview

In this week's discussion, you will have the opportunity to talk about what you have learned in this course that could apply to your life or to the lives of those around you. In addition to identifying some general applications, you will also be asked to provide specific examples.

u10s2 - What You Need to Know

Exponential and logarithmic functions can be used to model many types of applications from population models to decibel levels. We can use algebra to figure out how much technetium-99m is still in a patient's body after a radionuclide ventriculography procedure was performed. Since the procedure involves injection of radioactive technetium-99m (half-life of 6 hours), the relative amount still in the patient's body after 12 hours is approximately:

[CP: Please insert equation here, using the image saved as "U10s2 equation.png" in the course files]

In the following video, watch your instructor explain how to solve an equation with a logarithm:

- [Equation with Log](#).

To learn more about exponential and logarithmic functions, read the following from Chapter 10, "Inverse, Exponential, and Logarithmic Functions," in your *Algebra for College Students* text:

- Section 10.2–10.6, pages 627–665. Chapter 10 introduces the idea of exponential and logarithmic function, their properties, and how they can be applied to real-life applications.

u10a1 - Unit 10 Homework

Assignment Introduction

This homework assignment will help you practice the skills you learned this week.

Assignment Instructions

Sign into MyLab, and go to **Unit 10 Homework** in the **Homework, Quizzes, and Final** link. Complete problems 1–31.

As a reminder, if you need additional help accessing and using MyLab Math, refer to the MyLab Math Learner Guide [PDF].

Once you have completed your work to your personal satisfaction, in the submission text box in the assignment area, **write a note to your instructor stating you have completed the MyLab Math homework**, and submit the note. At that time, the grade that you have in MyLab Math will be entered in the courseroom as your final homework activity grade.

Remember that all activities, including homework, are due by the close of the week or as directed by your instructor.

u10a2 - Final Exam

This exam will be for the material you learned throughout the entire course.

To access the exam:

1. Sign into MyLab, and go to the **Homework, Quizzes, and Final** link.
2. Click **Final Exam**, which is located in the middle of the page.
3. Prior to starting, make sure you read the instructions and reminders located on the **Are you ready to start** page.
4. Once you are ready to actually start the exam, click **I am ready to start**, which is located on the right-hand side of the page.
5. Click the **Submit** button when finished.

Note: There is a 180-minute (3-hour) time limit for the final exam.

As a reminder:

- You have one chance to take the exam. Make sure you are prepared prior to starting the exam.
- You must answer all of the questions within one session. You cannot log out of the exam in the middle of taking it and then go back in later to finish it.
- Once you have submitted the exam, your grade is recorded. You will be brought to a screen on which you can see your grade and the results of each exam question.

If you have any issues or questions, contact your instructor.

u10d1 - Write Your Discussion Post

In this course, you have learned different algebraic concepts, including:

- The basic rules and symbols of algebra.
- Exponents.
- Roots.
- Order of operations.
- The slope of a line.
- Linear and nonlinear equations.
- Interpreting problems using inequalities.
- Interpreting bar graphs and charts.
- Adding, multiplying, subtracting, dividing, and factoring polynomials, trinomials, and binomials.
- Radical expressions.

You have also learned how to generally apply mathematical concepts to science, business, and everyday life. In order to complete this discussion, take a few moments to review these concepts as well as others in the course.

In your post, discuss what have you learned in this course that could apply to your life or to the lives of those around you. Provide specific examples.