

## Preview: MAT1100 : Using Math in the Real World

### Syllabus

#### Course Overview

Math has given people the tools to survive since the dawn of time. Literally. Creating the wheel helped our ancestors be more productive by allowing them to move heavy objects. Developing a way to count and track numbers allowed them to establish trade, grow crops, build cities, and begin exploring our world. Today, understanding how to use math is just as critical to your success. Whether you're altering a recipe, planning a road trip, purchasing a car, creating a household budget, or financing college—you'll need to know how to use and interpret the numbers that make up our world.

The same is true in the workplace. Virtually all modern careers require a basic understanding of mathematical concepts to fulfill daily duties, whether that's analyzing spreadsheets and graphs, filling out expense reports, or tracking employee hours. And when challenges come your way such as a surprise medical bill at home or a salary change at work, you'll understand how to interpret and use math to meet these challenges successfully and stay on track to achieve your personal and professional goals.

Over the next 10 weeks, the concepts you're learning in this course will help you develop two essential employability skills. They are:

- **Productivity** to learn organizational strategies that can make you more efficient and effective in this course and beyond.
- **Problem Solving** to analyze data and work through and overcome everyday challenges.

Throughout this course, you'll use both of these skills to find solutions to mathematical problems. Together, practicing both productivity and problem solving will help you understand how to think about and apply mathematical concepts in your real life so you can reach your career dreams. Though math may be useful for solving basic real-world challenges, that doesn't mean getting used to how it works is expected to be easy. Math anxiety is part of the equation for many learners such as yourself.

## Essential Undergraduate Learning Outcomes

All General Education courses reflect our Essential Undergraduate Learning Outcomes (EULOS). MAT1100 supports these outcomes: Communications, Problem Solving (which includes Critical Thinking, Creative Thinking, and Quantitative Reasoning). Review the Essential Undergraduate Learning Outcomes interactive media piece to learn more about these learning outcomes and how MAT1100 supports these outcomes.

## General Education Information Research Skills Library Guide

A Capella University library guide has been created for your use in general education courses. The [General Education Information Research Skills Library Guide](#) contains tips on how to use the Capella University Library to find resources for your courses. You are encouraged to refer to the resources in this library guide to direct your research in this course.

## Assignments

Week 1: Complete questions from MyLab Math on whole numbers and order of operations. 5% of grade.

Week 2: Complete questions from MyLab Math on operations with fractions and decimals. 5% of grade.

Week 3: Complete questions from MyLab Math on operations involving percentages. 5% of grade.

Week 4: Complete questions from MyLab Math on operations involving units of measurement. 5% of grade.

Week 5: Complete questions from MyLab Math on operations with signed numbers and scientific notation. 5% of grade.

Week 6: Create charts in Excel and calculate statistical measures from a data set. 5% of grade.

Week 6: Complete questions from MyLab Math on statistical measures and probabilities. 5% of grade.

Week 8: Complete questions from MyLab Math on operations involving formulas and proportions. 5% of grade.

Week 9: Complete questions from MyLab Math on operations with straight lines. 5% of grade.

Week 10: Complete questions from MyLab Math on operations involving systems of linear equations. 5% of grade.

## Discussions

Participation in discussions will count for 11% of your final grade.

Week 1: Use data to create a household budget for annual gas expenses.

Week 2: Use operations with fractions to adjust a pancake recipe to yield the desired amount.

Week 3: Calculate the savings needed to fund retirement accounts based on data from three quarters.

Week 5: Use scientific notation to express large numbers.

Week 8: Use Excel formulas to track a family's monthly expenses.

Week 9: Find the slope-intercept of a scatterplot and make predictions.

## Course Competencies

(Read Only)

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

- 1 Explain organizational strategies that can be applied to the field of mathematics.
- 2 Use basic arithmetic and algebra to solve real-world quantitative problems.
- 3 Use basic probability and descriptive statistics to solve real-world quantitative problems.
- 4 Apply in text the standard writing conventions for the discipline, including structure, voice, person, tone, and citation formatting.

## 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.

#### eBook

Cleaves, C., & Hobbs, M. (2019). *College mathematics for trades and technologies with MyLab for Math online access [custom bundle] (10th ed.)*. New York, NY: Pearson Learning Solutions. ISBN: 9780136796756.

### Library

The following required readings are provided in the Capella University Library or linked directly in this course. To find specific readings by journal or book title, use [Journal and Book Locator](#). Refer to the [Journal and Book Locator library guide](#) to learn how to use this tool.

- Thorpe, J. (2019). [Mathematics borrows from everyday language](#). *Mathematics Teaching*, 266, 34–37.

## 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.

## Library

The following optional readings may be available in the Capella University Library. To find specific readings by journal or book title, use [Journal and Book Locator](#). Refer to the [Journal and Book Locator library guide](#) to learn how to use this tool. If the full text is not available, you may be able to request a copy through the [Interlibrary Loan](#) service.

- Frye, C. (2013). [Microsoft Excel 2013: Plain & simple](#). Microsoft Press.

## Unit 1 >> Order of Operations

### Introduction

#### The Story of Mathematics

Historians point out evidence of early human civilizations using math as a way to keep track of lunar or solar cycles, count animals, and track food and population. One of these early civilizations was in the

Sumer region, in what is modern-day Iraq. Sumerian math was a bureaucratic invention to manage taxation, and from there, it grew into a system that enabled the study of astronomy. Sumerian math gave way to codifying large numbers and helped give rise to a sophisticated calendaring system.

Around 36 BCE, the Mayans created the concept of zero. This development gives us the ability to work with sums up to the hundreds of millions and without the zero, we would not be able to do modern math.

Math is a language and like any language, we are able to learn it. As a child we first experienced math when we saw that one cookie plus another cookie makes two cookies. As our abilities developed, math became a part of our nature. Some parts of it are a human-designed system, but it is also a natural occurrence. Yet, when we encounter formal math language, we forget that it is a language that can be learned, just like any other language.

**Reference:**

The Story of Mathematics. (n.d.).  
<https://www.storyofmathematics.com/story.html>

*“To not know math is a severe limitation to understanding the world.”*

*--Richard Feynman, Theoretical Physicist*

For a pastry chef, the right amount of sugar can mean the difference between five-star reviews or a whole lot of wasted dessert. For an air traffic controller, calculating new landing patterns on the fly can prevent catastrophe. Once you look around, it's easy to see the numbers, patterns, and equations that make up our world. And having a clear understanding of how to use this information can expand your success at home, work, and school. This week you will learn about order of operations and formulas. As you learn about these concepts, consider how these are transferable to your personal and professional success.

Welcome to MAT1100! During the next 10 weeks, this course will help you approach your life in a new way by giving you the confidence to use and interpret the real-world mathematics around you, so you can reach personal and professional success.

You will use the skills of productivity and problem solving each week as you complete your homework. Lean on your productivity skill to help you complete your work on time, and use your problem solving skill to solve the weekly math problems. As you complete your homework, consider how the application of these math skills is transferable to your personal and professional life.

### To-Do List:

- **Discussion:** Create a gas budget based on the prior year's budget.
- **Prepare:** Register on MyLab Math and become familiar with this site. Use the MyLab Math Learner Guide to get you started.
- **Assignment:** Complete the assigned MyLab Math problems. You will have problem sets to practice order of operations and other basic concepts such as exponents, roots, and powers of 10.
- **What You Need to Know:** Read about whole numbers and decimals, order of operations and problem solving, and the language of math.
- **Interactive Learning Module:** Listen to Queen Latifah's advice on how she overcame her math fears and used math to help her career.

## Learning Activities

### u01s1 - Activity Overview

## Discussion Overview

In this week's discussion post, you will consider the importance of math to you in your everyday life. How will you use this information in your everyday life? In which areas of your life might math already be at work?

## Assignment Overview

This week we are covering what we can do with whole numbers. Specifically, we will focus on order of operations and formulas. You will practice the skills introduced this week using MyLab Math, and later, in Week 4, you will be tested on your knowledge in the first quiz.

## u01s2 - What You Need to Know

### Preparation

You will do your homework each week through MyLab Math. To register, use the access code and instructions bundled with your VitalSource eBook. When you enter your ebook, refer to the pop-up in the right cover to click and reveal your access code for MyLab Math.

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 and tests. This link takes you to your homework for each week and to the three quizzes.

### Whole Numbers and Decimals

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. In general, whole numbers (such as 3, 17, 127) can be used for counting (answering the question "how many?") and decimal numbers (such as 3.75, 24.444, 133.33) can be used to quantify outcomes (answering the question "how much?").

To learn more about the types of numbers you will use in this course, read:

- *College Mathematics for Trades and Technologies*.
  - Chapter 1, "Review of Basic Concepts:"
    - Section 1–1, "Basic Operations with Whole Numbers and Decimals," pages 2–24.

### Order of Operations and Problem Solving

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 perform 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.

For more about the order of operations, read:

- *College Mathematics for Trades and Technologies*.
  - Chapter 1, "Review of Basic Concepts:"
    - Sections 1–2, "Exponents, Roots, and Powers of 10," pages 28–32.
    - Sections 1–3, "Order of Operations and Problem Solving," pages 33–43.

## The Language of Math

- Read Thorpe, J. (2019). [Mathematics borrows from everyday language](#). *Mathematics Teaching*, 266, 34–37. In this article, a math professor discusses his observations on what happens when the language of math is not understood clearly because math terminology may sound common but is actually used differently in mathematics.

### u01d1 - Write Your Discussion Post

In this week's discussion, you will consider a real-world scenario and share your thoughts on a similar scenario from your everyday life. Consider this scenario about Emily and Rob, who want to track their monthly household expenses. Last year, they spent the following amounts on gas:

Month	Amount
January	\$118.09
February	\$124.67
March	\$121.89
April	\$156.70
May	\$144.23
June	\$138.02
July	\$205.62
August	\$221.82
September	\$180.93
October	\$146.52
November	\$151.62

Month	Amount
December	\$133.17

Create a post that addresses the following questions:

1. Suppose Emily and Rob want to create a budget for the money they spend on gas this year. What would you suggest to be their **yearly** budget for gas, and why?
2. Similarly, what do you think they should use as their monthly budget? What difficulties do you foresee if the **monthly** budget is the same for each month?
3. Provide at least one similar example from your personal life. Explain why the example is relevant to you and how math can help you with it.

## Response Guidelines

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

- How similar are your results to those of your peers, and in which ways are your results different?
- Consider similarities and differences between your examples and those of your peers. Can you relate to the examples presented by your peers?

### Course Resources

Undergraduate Discussion Participation Scoring Guide

## u01a1 - Register With MyLab Math

## Preparation

If you have not registered with MyLab Math yet, you will need to do so. You will do your homework each week through MyLab Math. To register, use the access code and instructions bundled with your VitalSource eBook. When you enter your eBook, refer to the pop-up in the right cover to click and reveal your access code for MyLab Math.

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

and tests. This link takes you to your homework for each week and to the three quizzes.

## 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 \[PDF\]](#).

1. Sign into MyLab, and click the Homework and Tests link.
2. When you get to the list of homework assignments for the course, select **Homework 1**.
3. This will take you to the Homework Overview page.
4. Complete questions 1–18. Click a question number to begin.

Once you have completed your work to your 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.

### u01a2 - Homework for Week 1

## Overview

This week, you read about the order of operations. The homework helps to reinforce your learning of these concepts and we encourage you to start the homework early in the week so you won't be rushed; thereby giving you ample time to work through the problems and reach out to your instructor or classmates, if needed.

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 can move from one problem to another as you wish. This can be done by using the navigation tools right above the problem.
- Once you answer a problem correctly, you can see a small green checkmark next to the number of the problem.

- You can save your work at any time by clicking the Save button at the bottom of the problem box.
- You can access and complete each problem as many times as you would like to practice and improve your overall grade for the homework.

## Competencies Measured

By completing this homework, you will demonstrate your proficiency in the following course competencies and assessment criteria:

Competency 1: Explain organizational strategies that can be applied to the field of mathematics.

- Perform operations with whole numbers and use the order of operations correctly in most given situations.

### u01v1 - Interactive Learning Module: Capella Stories - Math Confidence with Queen Latifah

Wondering what math looks like outside of the classroom? Just ask the Queen! In this week's Capella Stories, superstar Queen Latifah explains how she uses mathematical concepts and principles to reach success in her own career. Plus, she'll share how she overcame her math anxiety to multiply her success.

## Unit 2 >> Operations with Fractions

### Introduction

## Famous Landmarks Based on Mathematics

### La Sagrada Família

In the heart of Barcelona, Spain, tourists flock to see the Sagrada Família, a cathedral designed by Antoni Gaudí. It is designed with hyperbolic and paraboloid structures, which are shapes similar to that of a Pringles potato chip. Throughout the cathedral you can see the use of geometric curves that make this structure a true masterpiece. In fact, this landmark is considered a “mathematician’s dream” given its geometric symmetry.

### **Eiffel Tower**

One of the most famous landmarks, the Eiffel Tower, was designed with a geometric curve placed on the outside edges to help with the tower’s wind resistance. Gustave Eiffel used a mathematical equation to help him determine the length and width of the tower so that it could withstand wind and also the natural expansion and contraction of steel.

### **The Great Pyramids of Giza**

It is astounding to think of the mathematics behind the building of the pyramids of Giza in Egypt. The pyramids stand as proof of the Egyptian’s advanced knowledge of mathematics and geometry at that time. The ancient designers and builders of the pyramids repeated geometric symbols throughout the structure. For example, the value of pi is found in the perimeter of the base divided by twice the height. Pi is also found when the perimeter of the north or south wall of the King’s Chamber is divided by the length of the wall.

### **References:**

Science of the Eiffel Tower. (n.d.). <https://stemeiffeltower.weebly.com/math.html>

Sorene, K. (2010, October 28). *9 Most mathematically interesting buildings in the world*. Tripbase. <http://blog.tripbase.com/9-most-mathematically-interesting-buildings-in-the-world/>

Hunkler, T. G. (n.d.). *Symbolism and coincidences of the great Pyramid*. Hidden Mysteries: The Magazine. <http://www.hiddenmysteries.org/themagazine/vol8/pyramid/hunkler.shtml#georel>

*"Organizing is what you do before you do something, so that when you do it, it is not all mixed up."*

*--A. A. Milne, Author of Winnie the Pooh*

If you've ever tried to clean up your desktop or room, sort your expenses, or declutter your junk drawer, you understand the power of organizing. Deciding how to group like things—whether those things are personal bills, kitchen utensils, socks, or even professional tasks—can free up mental and physical space and save you time. Similarly, the mathematical concepts you're learning in this course are based on organizational processes that, when applied correctly, can help you save time and complete your work successfully.

This week, you'll learn how to work with fractions and decimals, and look for examples where these concepts can help you understand how getting organized can help you work more productively in this course and beyond?

### To-Do List:

- **What You Need to Know:** Read about mixed numbers and fractions, and top 10 ways you can use math in real life.
- **Discussion:** Explain which operations with fractions can be used to modify a recipe.
- **Assignment:** Complete the assigned MyLab Math problems. Your problem sets will focus on adding, subtracting, multiplying, and dividing fractions along with how to work with them as fractions and as decimals.

## Learning Activities

### u02s1 - Activity Overview

## Discussion Overview

This week's discussion continues to explore how math affects your life in tangible ways. How will you use this information in your everyday life? Review sections 2–1 to 2–4 in your *College Mathematics for Trades and Technologies* text. Specifically, focus on calculations with mixed numbers and fractions. For example, look at Example 6 on page 86 and Examples 4 and 5 on page 92. Can you think of similar examples that you might encounter?

## Assignment Overview

This week we are covering what we can do with mixed numbers and fractions. Section 2–1 prepares you to find a common denominator when adding or subtracting fractions. In Section 2–2, you will convert decimals to fractions and fractions to decimals. Sections 2–3 and 2–4 will show you how to add, subtract, multiply, and divide fractions. You will practice the skills introduced this week using MyLab Math, and later, in Week 4, you will be tested on your knowledge in the first quiz.

## u02s2 - What You Need to Know

### Organization and Productivity

Imagine going grocery shopping and not being able to find the bananas. Or strolling down the aisles and seeing the raw chicken next to the apples and the cereal between the detergent and frozen pizza. When we grocery shop, we expect to be able to find what we need quickly and easily. That's because the products have been **organized** throughout the store in a logical way to make our shopping experience more efficient.

**Organizing is the process of arranging elements into a whole of interdependent parts.** In other words, it's a way of grouping things together based on patterns or relationships. For example, celery, carrots, and other vegetables are placed together in the produce aisle. Organizing is an essential part of honing your productivity skill because it helps you clearly break down the tasks and problems you face into smaller sets so you can analyze and work with those sets in a more manageable way.

When you're disorganized, on the other hand, it can lead to frustration and messy or incorrect work, which is not productive. Organization also helps us make better decisions by understanding how new knowledge relates to what we already know. For instance, even if we've never seen a turnip before, and we find it beside the squash in the produce section, we can assume it's a type of vegetable. But, organizing is not just a handy strategy for finding the right foods at the grocery store. You can use organization in this course and in your career to help you manage your thoughts, your workspace, and even your time.

Organizing can help you recognize mathematical patterns, figure out what you already know and don't know about a problem, and more easily master new concepts by comparing them to the knowledge you already have. As you discover how to complete the mathematical problems and techniques you're learning in this course, you'll be practicing the organizational strategies that will improve your productivity in MyLab Math. But, you can apply these same organizational strategies in your personal or professional life to perform your best there as well!

#### Organization Tips

There are several ways you can use organization to improve your productivity in this course and beyond by organizing your brain, organizing your workspace, and organizing your time. Review the sections below for some handy tips on how to stay organized in this course, as well as in your personal and professional life.

**Organize your brain.** Organizing your brain by allowing yourself the time to rest and focus, helps you give your full attention to every task you face. Try:

- Getting enough sleep.
- Taking breaks.
- Avoiding multitasking.

**Organize your workspace.** Organizing your workspace will help you avoid distractions and keep you from wasting precious time searching for the materials you need. Try:

- Decluttering to get rid of nonessentials! Clutter is a distraction!
- Having important items within reach. For this course, that might mean having scrap paper handy for working through problems.
- Remembering your virtual workspace! Consider saving your MyLab Math password to your desktop, setting aside time to check e-mail, and so on.

**Organize your time.** Keeping your time organized will help you figure out how long tasks and problems will take to complete and ensure you have the time you need to finish them successfully! Try:

- Starting with an understanding of your goals.
- Outlining your priorities. What do you need to address first to meet your goals?
- Using time-blocking to organize your time in a way that works for you.

**Time-blocking is a strategy that involves assigning yourself blocks of time to complete specific tasks instead of simply working through a list of tasks one-by-one.** Time-blocking helps you stay organized because instead of working off of an open-ended to-do list in a random order, you can dedicate the appropriate amount of time to each task or topic on your list without being sidetracked by other priorities.

Billionaire and CEO Elon Musk uses time-blocking to manage two companies at once while also dedicating large portions of time to his family and personal health. To use time-blocking in your own life and career, you can group activities by like tasks or like topics. To group by like tasks, you should understand the tasks you need to complete each day and set aside blocks of time to complete the most important tasks first. For example, if you know it takes you an hour to complete the discussion questions for each course, and you have three courses, you might set aside a three-hour block to complete all your discussion questions. During that time, you would only focus on discussion questions and nothing else.

To group by like topics, you could set aside three hours for your MyLab Math learning in this course this week, four hours for household tasks like cleaning, laundry, and lawn care, and six hours to study for an assignment in another course. Time-blocking makes you more productive because you won't have to constantly make choices about what you should be concentrating on. At the end of the day,

you can review your remaining priorities and use time-blocking to create a new schedule for the next day. It might be helpful to use time-blocking throughout this course by dedicating specific time for your MyLab Math problems and another set of time to read about the skills in the LEARN section each week.

Organization is a very personal trait, and it is crucial that you find methods that work for you. Use the tips above to get started, and remember, improving your organization will help you focus on what's important right now, so you can perform your best!

## Finding Parts of the Whole

Suppose you have a whole pizza and want to divide it equally among five children. Using only whole numbers, it would not be mathematically possible to describe how much each child gets, since we cannot subdivide the whole number 1 (one pizza) into smaller whole numbers. To solve this problem, we use fractional numbers, or simply fractions. In the current scenario, each child would receive one-fifth of the pizza. Sometimes, we want to write fractions as decimals; for example, one-fifth would correspond to the decimal number 0.2, since 0.2 times five is one.

## Mixed Numbers and Fractions

Using the whole numbers from Week 1, we can now turn our attention to fractions. A fraction, such as  $\frac{2}{3}$ , consists of a whole number divided by another whole number. We can think of the fraction  $\frac{2}{3}$  as the number, so that if it is multiplied by the whole number 3, it becomes the whole number 2. A fraction can be seen as being a part of a whole number; in this case,  $\frac{2}{3}$  is the third part of 2.

Also for this week, you will be learning how to write fractions as decimals, and decimals as fractions. Since we treat fractions as numbers, we are also interested in how we can add, subtract, multiply, and divide fractions.

To learn more about the mixed numbers and fractions you will use in this course, read the following:

- *College Mathematics for Trades and Technologies.*
  - Chapter 2, "Review of Fractions:"
    - Section 2–1, "Multiples and Factors," pages 60–68.
    - Section 2–2, "Equivalent Fractions and Decimals," pages 69–80.
    - Section 2–3, "Adding and Subtracting Fractions and Mixed Numbers," pages 83–87.
    - Section 2–4, "Multiplying and Dividing Fractions and Mixed Numbers," pages 89–99.

## Math in Real Life

- [Top 10 Ways to Use Math in Real Life \[PDF\]](#). This quick tips sheet gives you 10 ways where you can apply your math skills.

## u02d1 - Write Your Discussion Post

In this week's discussion, you will consider a real-world scenario and share your thoughts on a similar scenario from your everyday life.

A pancake recipe calls for the following ingredients:

- 1  $\frac{1}{2}$  cups all-purpose flour.
- 3  $\frac{1}{2}$  teaspoons baking powder.
- 1 teaspoon salt.
- 1 tablespoon white sugar.
- 1  $\frac{1}{4}$  cups milk.
- 1 egg.
- 3 tablespoons butter.

The ingredients yield eight pancakes. Address the following questions:

1. How much of each of the ingredients do you need to make 16 pancakes, 4 pancakes, 12 pancakes? Explain which operations with fractions you used to obtain your answer.
2. Suppose you have only 2 cups of milk, but enough of all the other ingredients. How many pancakes can you make? Explain which operations with fractions you used to obtain your answer.
3. Provide at least one similar example from your personal or professional life. Explain why the example is relevant to you and how math can help you with it.

## Response Guidelines

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

- How similar are your results to those of your peers? In which ways are they different?
- Consider similarities and differences between your examples and those of your peers. Can you relate to the examples presented by your peers?

### Course Resources

## Undergraduate Discussion Participation Scoring Guide

### u02a1 - Homework for Week 2

## Overview

This week, you read about operations with fractions and decimals. The homework helps to reinforce your learning of these concepts and we encourage you to start the homework early in the week so you won't be rushed; thereby giving you ample time to work through the problems and reach out to your instructor or classmates, if needed.

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 can 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 can see a small green checkmark next to the number of the problem.
- You can save your work at any time by clicking the Save button at the bottom of the problem box.
- You can access and complete each problem as many times as you would like to practice and improve your overall grade for the homework.

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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 and Tests. This link takes you to your homework for each week and to the three quizzes.

## Competencies Measured

By completing this homework, you will demonstrate your proficiency in the following course competencies and assessment criteria:

Competency 2: Use basic arithmetic and algebra to solve real-world quantitative problems.

- Performs operations with fractions and decimals correctly in most given situations.

### Unit 3 >> Percents

#### Introduction

### The Common Core—Mathematics Standard

In 2009, leaders and educators from 48 states, two territories, and the District of Columbia met to determine what they believed should be the standards for children who graduate from high schools in the United States. These standards are known as the Common Core and guide how educators plan math and English lessons.

The Common Core Mathematics Standards emphasize learning math concepts and understanding the “why” of math rather than just memorizing steps and procedures. The standard believed that if students understood why  $2 \times 2 = 4$ , then students could apply this to solving real-world problems. Educators had to be trained on teaching math in a new way, which meant parents learning “new math.”

Many methods for solving math emerged to teach for understanding of concepts. For example, consider this method of solving by decomposing (or expanded form) the numbers:

$$27 + 62 =$$

$$20 + 60 = 80$$

$$7 + 2 = 9$$

$$80 + 9 = 89$$

The answer is 89! By breaking down the numbers into its digit values, computing them can easily be done in your head.

**References:**

Understood. 9 "newmath" problems and methods. (n.d.).  
<https://www.understood.org/en/school-learning/learning-at-home/homework-study-skills/9-new-math-problems-and-methods>

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*"Organizing isn't about perfection, it's about efficiency, reducing stress and clutter, saving time and money, and improving your overall quality of life."*

*--Christina Scalise, Author*

Ever feel like you have so much work to do that you just don't know how to begin? According to leading business experts, getting organized is always the first step to getting things done. That's why it's a crucial part of successfully honing the productivity skill you're learning throughout this course.

This week, you'll explore some key strategies to stay organized in your personal and professional life. You'll be able to apply these strategies to both your work on percentages in MyLab Math and your professional career!

## To-Do List

- **What You Need to Know:** Read about percentages and application of percentages.
- **Discussion:** Use percentages to help a couple calculate the rate of returns on their retirement savings.
- **Assignment:** Complete the assigned MyLab Math problems. The homework covers percentages and how to apply percent calculations to real-world problems.
- **Interactive Learning Module:** Get a behind-the-scenes look at Nicole Lapin's life, a best-selling author, financial expert, and entrepreneur.

## Learning Activities

### u03s1 - Activity Overview

## Discussion Overview

This week's discussion continues to explore how math can be used in everyday life. Review sections 3–1 to 3–3 in your *College Mathematics for Trades and Technologies* text. For the discussion, focus on calculations involving percent increase and percent decrease. For example, look at Examples 1, 3 and 5 on pages 138–140. Can you think of similar examples that you might encounter?

## Assignment Overview

This week we are covering what you need to know about percent calculations. Section 3–1 covers percent and number equivalents, for example that  $5\% = 0.05$ . In Section 3–2, you will work various percent-of-the-whole problems. Sections 3–3 will show you how to work with percent increases and percent decreases. These skills are introduced this week using MyLab Math, and later, in Unit 4, you will be tested on your knowledge in the first quiz.

### u03s2 - What You Need to Know

## Productivity in the Workplace

In the professional world, workplaces measure productivity by how effectively their teams use company resources like money, time, and people. When a company isn't productive, what it really means is that they are using resources ineffectively.

For example, let's say your company creates a new policy where you have to run your travel expenses by three different managers before they are approved. You realize this isn't the best use of resources because it means that three people are spending time approving the same documents. By creating a better system, your company could organize the workload so that managers only approve travel expenses for their direct employees. This is a better use of the company's resources and will ultimately make the approval process more productive.

Organizing can also help you better use your resources at home. Imagine you're making lunch for your three children before they head to school. You have enough ingredients to make three turkey and cheese sandwiches and about 10 minutes before their bus comes. If you pile all the turkey and cheese on one sandwich or spend all of your time spreading the mayo, not only will you have some pretty unhappy kids, but you also will not be using your resources effectively. If you take the time to

consider the resources you have and organize them appropriately, you'll be more productive at making lunch.

Learning to organize resources in the best way possible can ensure that people work efficiently and effectively in any situation. And, organization can also ensure you use your academic resources in the best way too.

No matter if you're working on an equation in MyLab Math, a paper in your English class, or a professional group project, there are some simple strategies you can follow to ensure you're staying organized and not wasting your time. They are:

- Set a goal or goals.
- Identify the significant pieces.
- Sort by components, sequences, patterns, or priorities.
- Evaluate with your goal in mind.

Continue reading below for an understanding of each of these strategies.

### Set a goal or goals.

Being organized requires an understanding of what you're ultimately trying to achieve. It also allows you to evaluate if you are spending time moving toward your goal. Just like with a road trip, if you don't know your final destination, you'll never be able to get there.

### Identify the significant pieces.

What do you need to focus on to complete your goal? Perhaps it is a word problem where you need to decide which data is the most relevant to the equation. Or, maybe you're trying to create a seating chart for your friend's wedding and need a better understanding of who is coming and how the tables will be arranged. Learning how to identify the information that will help you obtain your goal or goals will put you well on your way to staying organized.

### Sort by components, sequences, patterns, or priorities.

If you've ever heard Sesame Street's famous song "One of these things is not like the other," you understand the importance of identifying, separating, and sorting like-things from different things. In this course and the math world, sorting helps you to understand relationships among sets, how the sets are represented, and how to analyze those sets. It also helps us better understand how rules apply to sets. This is crucial in both improving your productivity and boosting your ability to recognize patterns when problem solving.

Think about your kitchen, for example. You probably keep spices in one area, bowls in another, and forks, spoons, and knives together. You've separated each of these "sets" in your kitchen by the way you use them to eat and serve meals. If someone gives you a new spice to try, you'll already know where to store it because you've created rules around the sets of items you own. Sorting can help you reach your goal faster by allowing you to more easily understand and accomplish what you need to. By following pre-established sorting rules, you'll save valuable time and brain space.

### Evaluate with your goal in mind.

Once you've sorted the information you have and prioritized the most important sets, it's time to evaluate that information. Part of evaluating means applying previous knowledge to what you've sorted to reach your goal. For instance, imagine you're ordering office supplies, and you've asked each employee for a list of materials. After sorting the materials into sets of supplies, you now know how many pens, notebooks, and staplers you need to order. But, you want to evaluate those sets and make overall decisions before you complete your goal. For example, you notice the total requested amount of pens is less than you've ordered in the past. Therefore, you decide to increase your order to ensure you have enough supplies for the group.

Evaluating our organization not only makes us more likely to reach our goal; it also helps us understand how new knowledge relates to what we already know.

Keep in mind that organization is a personal practice. You can use the organizational strategies in this course or adapt them to make them to work for you. It's more about acquiring good habits and staying focused on those habits than adopting a specific strategy. Also, it's very likely that the way you organize your work will look different from your peers or coworkers. One of the best ways to hone your productivity skill is by setting up time each week to reflect on which techniques are working for you and which aren't. This will help you continue to improve your productivity over time.

## Percent and Base

When dealing with percentages, it is always important to understand the base from which the percentage is calculated. This means, when hearing about percentages, you should always ask "percent of what?"

For example, suppose you have \$10,000 in an investment account and in the first year, the balance increased by 10%; in the second year, it decreased by 10%. Did you end up again with \$10,000 at the end of the second year? The answer, is: "no." The reason for this is that for the first year, the base was \$10,000, so the increase was 10% of \$10,000, which is \$1,000. However, for year two, the base was \$11,000, and 10% of that amount is \$1,100. So, you end up with  $\$11,000 - \$1,100 = \$9,900$ !

## Percentages and Applications of Percentages

In this unit, we focus on percentages, which you can think of a fraction with a denominator of 100. For example, the decimal number 0.05 can be written as  $\frac{5}{100}$ , which means its percent equivalent is 5%.

Once you have covered the section on number equivalent of percentages, you will see many real-world applications of percent calculations in Sections 3–2 and 3–3. As you work through these problems, think about how you might encounter similar situations in your life.

To learn more about the percentage problems you will use in this course, read the following:

- *College Mathematics for Trades and Technologies*.
  - Chapter 3, "Percents:"
    - Section 3–1, "Percent and Number Equivalent," pages 116–120.
    - Section 3–2, "Percentage Problems," pages 121–137.
    - Section 3–3, "Increase and Decrease," pages 138–145.

### u03d1 - Write Your Discussion Post

Emily and Rob also keep track of the savings they have in their retirement accounts. The data for the first three quarters of the year are:

- Beginning Balance (January 1): \$312,500
- End of Quarter 1 (March 31): \$354,100
- End of Quarter 2 (June 30): \$368,900
- End of Quarter 3 (September 30): \$344,700

In your post, address the following questions:

1. Suppose the balance increases 3.5% from September 30 to December 31. What is the balance on December 31? Clearly describe the relevant calculations and identify the rate and the base in the percentage calculation.
2. What is the percent increase from January 1 to March 31 and from March 31 to June 30? Clearly describe the relevant calculations and identify the rate and the base in the percentage calculation.
3. What is the percent decrease from June 30 to September 30? Clearly describe the relevant calculations and identify the rate and the base in the percentage calculation.

4. Provide at least one similar example from your personal or professional life. Explain why the example is relevant to you and how math can help you with it.

## Response Guidelines

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

- How similar are your results to those of your peers? In which ways are they different?
- Consider similarities and differences between your examples and those of your peers. Can you relate to the examples presented by your peers?

### Course Resources

Undergraduate Discussion Participation Scoring Guide

## u03a1 - Homework for Week 3

### Overview

This week, you read about percentages and how to apply them to solve real-world situations. The homework helps to reinforce your learning of these concepts and we encourage you to start the homework early in the week so you won't be rushed; thereby giving you ample time to work through the problems and reach out to your instructor or classmates, if needed.

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 can 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 can see a small green checkmark next to the number of the problem.
- You can save your work at any time by clicking the Save button at the bottom of the problem box.

- You can access and complete each problem as many times as you would like to practice and improve your overall grade for the homework.

## Preparation

You will do your homework each week through MyLab Math. To register, use the access code and instructions bundled with your VitalSource eBook. When you enter your eBook, refer to the pop-up in the right cover to click and reveal your access code for MyLab Math.

[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 and Tests. This link takes you to your homework for each week and the three quizzes.

## Competencies Measured

By completing this homework, you will demonstrate your proficiency in the following course competencies and assessment criteria:

Competency 2: Use basic arithmetic and algebra to solve real-world quantitative problems.

- Perform operations involving percentages correctly in most given situations.

### u03v1 - Interactive Learning Module: Capella Stories - Planning for the Unexpected with Nicole Lapin

Nicole Lapin is a *New York Times* bestselling author, financial expert, and successful businesswoman. And just like you, she has to balance her personal and professional needs to reach her goals each day—especially while she's in the middle of a major book tour. In this week's Capella Stories get a behind-the-scenes look at Nicole's life while on the road and learn how she uses her productivity skill to organize her day, manage her time, and deal with the unexpected.

## Introduction

### Early Development of the Metric System

In 1668, an English clergyman, John Wilkins, proposed a standard system of units of measurement. His proposal sought to standardize units of measurement for length, area, volume, and mass. However, it wasn't until 1790, during the French Revolution, that a standard measurement system was proposed by the French Academy of Sciences and accepted.

The French Academy of Sciences created a system that became what we know today as the metric system, which establishes that the unit of length to be a portion of the Earth's circumference, or one ten-millionth of the distance between the North Pole and the equator. This unit of measurement was called "metre" and derived from the Greek word "metron," which means "a measure." The metric system uses a decimal (base 10) system allowing for easy calculations.

By 1960, more than 35 countries had adopted the metric system, officially known as the International System of Units. In the United States today, we still use dual measurements because lawmakers have not pushed the country to solely use a metric system.

#### Reference:

US Metric Association. (n.d.). *Origin of the metric system*. <https://usma.org/origin-of-the-metric-system>

*"One is random, twice is coincidence, and three times is a pattern."*

*--Peter F. DiSilvio, Writer*

When you're putting together a puzzle, you're looking for patterns in the shapes that will help you assemble the larger picture. Identifying patterns allows our brains to create rules around sets of information so we can assemble the little pieces more quickly. In other words, patterns help us organize the steps we need to take to be more productive, whether that's in a puzzle, in this course, or in our professional lives.

This week, you will unlock new ways to practice your productivity skill by working with mathematical patterns that can strengthen your organizational strategies. You will also learn how to work with units in the U.S. Customary System and the metric system, along with converting units within these systems and between these systems. The strategies you've already learned in this course and prior courses can be applied to real-world challenges. Patterns will help us assemble our steps to success no matter if we're facing a tabletop puzzle or a mathematical one.

## To-Do List

- **What You Need to Know:** Read about systems of measurement used in the U.S. and around the world.
- **Quiz:** Complete Quiz 1, which covers concepts from Weeks 1–3.
- **Assignment:** Complete the assigned MyLab Math problems. Your homework includes measurement conversions between systems of measurement and within the same system.

## Learning Activities

### u04s1 - Activity Overview

## Assignment Overview

This week we are covering what you need to know about unit conversion. Section 4–1 covers the U.S. standard system. Section 4–2 provides an introduction to the metric system, and Section 4–3 provides examples of how you can convert between these two systems of measurement.

## Quiz Overview

You will complete the first quiz of the course this week. The quiz covers the material in weeks 1 to 3 and is done using MyLab Math.

### u04s2 - What You Need to Know

*"It's not that I'm so smart, it's just that I stay with problems longer."*

*--Albert Einstein, Mathematician*

## Patterns and Your Life

Many students and professionals keep a “to-do” list to help prevent daily tasks from overwhelming their lives. Even though these “to-do” lists might include similar tasks, such as phone calls, grocery shopping, work assignments, personal errands, or kids’ activities, the order and amount of time required to complete those tasks will vary from person to person.

One person might group different tasks by location such as dropping off a package at the post office near work, for instance. Another might decide to run all of their errands on one day and hit the grocery store last, so their food doesn’t spoil. In the mathematical world, these differences in the way we get the same tasks done are called variations. And understanding the variations in the patterns we see in the world around us can help us more efficiently use our time, money, and energy. In other words, understanding patterns and how they vary can make us more productive.

This week, think about how patterns of variation can be utilized in your life and MyLab Math learning paths to maximize your productivity.

**Patterns** are defined as any sequence or series that repeats. They can be as simple as a wallpaper design or as complicated as a set of numbers that predicts a financial crisis. Identifying patterns helps us form connections to seemingly unrelated bits of information and draw conclusions from what we see.

When you’re using MyLab Math in this course, it’s important to think of mathematical patterns as sequences that follow specific rules. These rules form a relationship between numbers or variables to tell you how to calculate a particular answer. Tables, charts, formulas, and graphs are all used to express patterns and relationships such as speed to time, principal to interest, cost to volume to profit, supply to demand, or units of output to total cost. Math formulas are essential in business because they can show important details, such as cost, revenue, and profit, accurately and powerfully.

Understanding how to identify like-patterns and variations can help you well beyond this course to meet personal and professional goals such as creating a family budget, designing a layout for your office space, predicting growing job markets, or even making music and art. With practice, you’ll be able to use your understanding of patterns to identify the best organizational strategy for different situations, which will ultimately make you more productive in your personal and professional life.

## Metric and U.S. Customary Measures

When presented with measuring physical quantities, such as length, weight, volume, area, and temperature, having a common standard is key. Throughout the history of science, there were different standards that were applied by different nations.

# Systems of Measurement

In this unit, we focus on systems of measurement. Along the way, you will see many everyday applications of converting both within and between systems of measurement. As you work through these problems, think about how you might encounter similar situations in your life.

To learn more about the systems of measurement you will use in this course, read the following:

- *College Mathematics for Trades and Technologies*.
  - Chapter 4, "Measurement:"
    - Section 4–1, "The U.S. Customary System of Measurement," pages 158–171.
    - Section 4–2, "Introduction to the Metric System," pages 172–183.
    - Section 4–3, "Time, Temperature, and Other Measures," pages 184–188.

## u04a1 - Homework for Week 4

### Overview

This week, you read about operations involving units of measurement. The homework helps to reinforce your learning of these concepts and we encourage you to start the homework early in the week so you won't be rushed; thereby giving you ample time to work through the problems and reach out to your instructor or classmates, if needed.

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 can 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 can see a small green checkmark next to the number of the problem.
- You can save your work at any time by clicking the Save button at the bottom of the problem box.
- You can access and complete each problem as many times as you would like to practice and improve your overall grade for the homework.

## Preparation

You will do your homework each week through MyLab Math. To register, use the access code and instructions bundled with your VitalSource eBook. When you enter your eBook, refer to the pop-up in the right cover to click and reveal your access code for MyLab Math.

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 and Tests. This link takes you to your homework for each week and the three quizzes.

## Competencies Measured

By completing this homework, you will demonstrate your proficiency in the following course competencies and assessment criteria:

Competency 2: Use basic arithmetic and algebra to solve real-world quantitative problems.

- Perform operations involving units of measurement correctly in most given situations.

### u04a2 - Quiz 1

## Overview

In the last few weeks, you have read about and practiced problems dealing with order of operations, operations with fractions, and percents. You now have an opportunity to test your skills on these concepts.

## Preparation

You can prepare by following these suggestions:

- Review the readings from Weeks 1–3.
- You have two chances to take the quiz (the higher score counts).
- Allocate sufficient time to ensure you will be able to complete the quiz within the allotted time. There is a 120-minute time limit for the quiz.
- Remember that you cannot stop and restart the test. 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.

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

## Instructions

To access the quiz:

1. Sign into MyLab, and go to the Homework and Tests link.
2. Select Quiz 1, 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.
5. 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.

## Competencies Measured

By successfully completing this homework, you will demonstrate your proficiency in the following course competencies and assessment criteria:

Competency 1: Explain organizational strategies that can be applied to the field of mathematics.

- Solve geometric problems involving the use of decimals.
- Solve cost problems involving the use of decimals.
- Find an average using decimal numbers.
- Apply the order of operations to a series of operations.
- Solve applied problems using problem solving strategies.

Competency 2: Use basic arithmetic and algebra to solve real-world quantitative problems.

- Determine the prime factorization of composite numbers.
- Find the least common multiple of two numbers.
- Reduce fractions to lowest terms.
- Write improper fractions as whole numbers or mixed numbers.
- Write fractions as decimals.
- Solve application problems involving fractions.
- Add fractions and mixed numbers.
- Solve application problems using proportions.
- Write percents as their decimal equivalents.
- Solve business problems involving percents.

- Solve finance problems involving percents.
- Solve tax problems involving percents.
- Find the new amount in increase or decrease problems.
- Find the base in increase or decrease problems.
- Find the rate in increase or decrease problems.

## Course Resources

MyLab Math Learner Guide [PDF]

### u04d1 - Ask Your Classmates (Optional)

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.

## Unit 5 >> Scientific Notation

### Introduction

#### Math: Friend or Foe?

Have you ever tasted food that was really good and then asked for the recipe? Let's say it was grandma's famous butternut squash ginger soup. She tells you to add "a thumb of ginger," a "pinch of nutmeg,"  $\frac{1}{4}$  cup of heavy cream, and 5 cups of chicken stock. Granted, this is a simple recipe so if your thumb is bigger than grandma's, too much (or too little) ginger can be adjusted, but in other situations, it could mean life or death or thousands of dollars on the line.

## Wrong medicine dosage

It's okay to be freestyle and loose when we're cooking, but when you're talking about medical treatments, there's very little margin of error. In a 2004 case, a doctor had prescribed Zantac to treat heartburn in a baby. The prescribed dosage was 0.75 milliliter twice a day but the pharmacist had labeled the bottle "Give  $\frac{3}{4}$  teaspoonful twice a day" which is the equivalent of 3.7 milliliters, or five times the prescribed dose! Fortunately, the error was caught in time, but it could have led to seizures or stroke.

## Dyscalculia

You might have heard of the condition known as dyslexia where letters and words get jumbled when reading. In math, there's a condition that also causes a person to jumble up numbers and it's known as dyscalculia (this might explain why grandma's soup came out too thick or too watery.)

Dyscalculia is as common as dyslexia but it's not as well known or understood. Individuals with dyscalculia may find it hard to understand abstract concepts such as time, line up numbers into columns and rows, or use symbols or functions such as algebraic expressions.

## References:

US Metric Association. (n.d.). *Unit mixups*. <https://usma.org/unit-mixups>

Learning Disabilities Association of America. (n.d.). *Dyscalculia*. <https://ldaamerica.org/types-of-learning-disabilities/dyscalculia/>

*"No problem can stand the assault of sustained thinking."*

*--Voltaire, Philosopher*

Outside of the classroom, math isn't always a bunch of equations on a piece of paper. Mathematical problems are hidden in everyday situations such as how much of a loan you can afford to start a business, or which gym membership will give you the most bang for your buck. In real-world situations such as these, it's up to you to figure out what the problem actually is. In other words, once you understand the question or situation that needs to be solved, you can use the data available to figure

out how to solve it. Using and analyzing data is a key step to becoming a problem solving powerhouse.

This week, you'll learn how to find the information you need to solve problems about numbers in scientific notation in MyLab Math, as well as how to apply mathematical problem solving strategies to challenges in your personal and professional life.

### To-Do List:

- **What You Need to Know:** Read about signed numbers and powers of 10.
- **Discussion:** Explain how scientific notation is used to study large numbers such as the national debt.
- **Assignment:** Complete the assigned MyLab Math problems. You will work through problems about signed numbers, powers of 10, and Scientific Notation.

## Learning Activities

### u05s1 - Activity Overview

## Discussion Overview

This week's discussion uses scientific notation to write large numbers. Review sections 5–1 to 5–6 in *College Mathematics for Trades and Technologies*. For the discussion, focus on the examples in Section 5–6. Can you think of similar examples that you might encounter?

## Assignment Overview

This week we are covering what you need to know about signed numbers and using scientific notation. These skills are introduced this week using MyLab Math, and later, in Unit 7, you will be tested on your knowledge in the second quiz.

### u05s2 - What You Need to Know

*“Problems are only opportunities with thorns on them.”*

*--Hugh Miller, Geologist*

## Problem Solving

You're already familiar with the mathematical problems you're solving each week in MyLab Math for this course. But, a problem is any situation in life that requires a decision to be made—whether that involves numbers, relationships, ideas, or more.

Solving problems in your life and career might mean you have to wrestle with some pretty thorny situations, such as shopping around for affordable dental care, managing your company's delivery schedule, or predicting and preventing food waste at home. These examples and many others will require you to analyze data effectively and rationalize the best solution. In other words, they will require you to use your problem solving skill to turn problems into opportunities to learn and grow.

Luckily, problem solving is one of the essential employability skills you're learning in this course and throughout future courses here at Capella. Simply put, problem solving is your ability to draw conclusions about a particular situation so that you can take action with confidence.

Your problem solving skill will help you think logically about new situations, come up with solutions to various challenges, and make decisions about these solutions. Moreover, it will help you perform well across many different areas of your life, including the professional world. In fact, problem solving is vital to any career you want to pursue because it ensures you can think of new or better ways of doing things, explain challenging concepts to your team, save customers time and money, and get your work done despite the obstacles. Every workplace has difficult or unexpected situations that arise as a normal part of the job. That might mean an international merger, a high-pressure criminal case, an unexpected vacancy in your department, a shortage of medical supplies, or pressure from management to make a tight deadline. So, it's crucial to employers that employees are able to assess and handle these situations by identifying potential solutions.

And problem solving isn't just for the home or workplace. The same process and strategies you use to solve problems in your regular life and career can also be applied to the mathematical problems in this course. Problem solving can even help you overcome any anxiety you have about math by gaining a deeper understanding of mathematical concepts to better appreciate how math can continue to help you in your life and career.

### Problem Solving Tips

Whenever you encounter a problem for the first time, there are two important questions you need to consider. They are:

- What should I do?

- How should I do it?

For example, if you're a restaurant owner, who wants to stop using Styrofoam for take-home containers to be more eco-friendly, then you can use number one, "What should I do?" to start looking for alternative materials for your restaurant's takeaway containers. And, you can apply step two, "How should I do it?" to decide which type of biodegradable container is the best for your company.

With practice, clearly answering both of these questions will help you make decisions for any problem you face. Here are some basic tips to keep in mind as you answer the questions above:

- **Understand and explore the problem.** If you want to solve the problem, you need to understand what the problem is. *For instance, in the example above, could the problem actually be that your restaurant's portions are too large? Maybe that's what's causing your customers to take home so much food. By reducing your portion size, you could cut down on the number of containers you use.*
- **Find a strategy.** *If your customers' portions are the right size, and you believe your problem is truly about reducing your reliance on Styrofoam containers, then you may decide to test different types of biodegradable containers to see what holds up best in transport.*
- **Use the strategy to solve the problem.** *After testing both the fiber and paper containers, you decide that paper works best for your restaurant, and you immediately make the switch for all takeaway and takeout orders.*
- **Look back and reflect on the solution.** *After a few weeks, you reflect on your decision and review customer feedback to ensure that everyone is happy with the new containers. It's also easy to show your team the positive impact you're having by calculating how many biodegradable containers you're using instead of Styrofoam ones.*

Now that you understand some of the ways you can use your problem solving skill in the real world, you're ready to apply what you've learned to your work in MyLab Math. But, remember, it is not enough to simply solve a problem. You should be able to explain how and why you solved it in the way you did. Practicing problem solving will not only make you successful in this course; it will also help you continue to excel in unfamiliar situations in the future. Every time you solve a new problem, you'll learn from that problem, which will build up your confidence in your ability to continue to solve problems in this course and beyond!

## Writing Large and Small Numbers

Although most numbers we encounter on a day-to-day basis seem to be within reasonable bounds (for example the number of people in your household), large numbers occur as aggregate quantities (the number of people in a city or country). Scientific Notation provides an efficient way of writing very

large numbers; also, it can be used to write very small numbers (numbers that are very close to zero), such as the chance of winning the lottery.

## Signed Numbers and Powers of 10

In this unit, we focus on scientific notation in Section 5–6. However, Sections 5–1 to 5–5 provide important preliminary information, such as operations with signed numbers and calculations with powers of 10.

To learn more about the signed numbers, powers of 10, and scientific notation, read the following:

- *College Mathematics for Trades and Technologies*.
  - Chapter 5, "Signed Numbers and Powers of 10":
    - Section 5–1, "Adding Signed Numbers," pages 214–218.
    - Section 5–2, "Subtracting Signed Numbers," pages 221–224.
    - Section 5–3, "Multiplying and Dividing Signed Numbers," pages 225–229.
    - Section 5–4, "Signed Rational Numbers," pages 231–236.
    - Section 5–5, "Powers of 10," pages 238–241.
    - Section 5–6, "Scientific Notation," pages 242–251.

### u05d1 - Write Your Discussion Post

You are halfway through the course. Throughout the course, you have learned about the employability skills of productivity and problem solving. How have you used these skills so far to succeed in the course?

## Response Guidelines

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

- How similar are your results to those of your peers, and in which ways are they different?
- Consider similarities and differences between your examples and those of your peers. Can you relate to the examples presented by your peers?

## Undergraduate Discussion Participation Scoring Guide

### u05a1 - Homework for Week 5

## Overview

This week, you read about signed numbers and scientific notation. The homework helps to reinforce your learning of these concepts and we encourage you to start the homework early in the week so you won't be rushed; thereby giving you ample time to work through the problems and reach out to your instructor or classmates, if needed.

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 can 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 can see a small green checkmark next to the number of the problem.
- You can save your work at any time by clicking the Save button at the bottom of the problem box.
- You can access and complete each problem as many times as you would like to practice and improve your overall grade for the homework.

## Preparation

You will do your homework each week through MyLab Math. To register, use the access code and instructions bundled with your VitalSource eBook. When you enter your eBook, refer to the pop-up in the right cover to click and reveal your access code for MyLab Math.

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 and Tests. This link takes you to your homework for each week and the three quizzes.

## Competencies Measured

By completing this homework, you will demonstrate your proficiency in the following course competencies and assessment criteria:

Competency 2: Use basic arithmetic and algebra to solve real-world quantitative problems.

- Performs operations with signed numbers and uses scientific notation correctly in most given situations.

### Unit 6 >> Statistics

#### Introduction

## Big Data

Data is gold! Companies such as Facebook, Uber, and Google are spinning gold at this very moment! According to Africa Forbes (2019), the new gold is data because with the right manipulation, it can provide valuable insights that can be applied to business, healthcare, or practically any industry. Additionally, companies such as Facebook and Google with subscribers can sell collected data to the highest bidder.

What does math have to do with big data? According to Plus Magazine (2016), big data is one of the great eight mathematical technologies. Mathematical techniques are used to study the relationships between objects in a network, or network theory. Math, along with computer science, are used to create algorithms that classify, interpret, and analyze big data. Through tools that include spreadsheets, databases, matrices, and graphs, data scientists are able to glean insights into things such as finding consumer shopping patterns, modeling health trends, tracking the outbreak of a disease, and predicting weather patterns around the world.

#### References:

Forbes Africa. (2019, July 18). *Data is the new gold*.

<https://www.forbesafrica.com/technology/2019/07/18/data-is-the-new-gold/>

Budd, C. (n.d.). *Eight great reasons to do maths*. Plus Magazine.

<https://plus.maths.org/content/great-eight>

Budd, C. (n.d.). *Big data*. Plus Magazine.

<https://plus.maths.org/content/big-data>

*“...problems create value; the more problems you can solve, the more valuable you will be, the more money you will make, the more responsibility you will have.”*

*--Brian Klemmer, Author and Speaker*

If you've ever played fantasy football, you know the importance of using player statistics or “stats” like sacks and fumbles to plan your perfect team. But statistics play an important role in mathematics as well. Statistics is the process of taking large amounts of numerical data (such as from a football player's track record), analyzing that data, and using it to solve problems (such as which player you should play and when). And it isn't just for the football fan. In almost every field, from biology or business to psychology or math, understanding statistics helps professionals solve problems and make decisions.

Over the next two weeks, you will also learn various problem solving strategies and explain how they can be used in this course and throughout your life and career. Learning to add strategies to your problem solving techniques will help you multiply your success at school, work, and home.

This week, you will apply problem solving skill to learn how such statistics are calculated, what they mean, and how they can be used to make evidence-based decisions in real life. Also, you will learn about different types of charts used in statistics and how they are created using Microsoft Excel.

### To-Do List:

- **What You Need to Know:** Read about numerical summaries such as mean, median, and mode. You will also review a variety of resources on Excel to help you with your assignment. Read the top 10 ways to use statistics as a problem solving tool.
- **Assignment:** Use Excel to create a chart that calculates statistical measures based on a set of data.
- **Assignment:** Complete the assigned MyLab Math problems. You will complete problems on statistical measures and probabilities.

## Learning Activities

### u06s1 - Activity Overview

## Assignment Overview

The first assignment is covering what you need to know about graphical and numerical summaries of data. These skills are introduced this week using MyLab Math, and later, in Week 7, you will be tested on your knowledge in Quiz 1.

The second assignment includes using Excel to calculate statistical measures where you will use real-world data to produce graphs and calculate some statistical measures. You can make yourself familiar with how to work in Excel by visiting the resources provided with this assignment.

### u06s2 - What You Need to Know

*“The problem is not that there are problems. The problem is expecting otherwise and thinking that having problems is a problem.”*

*Theodore Rubin, Psychiatrist and Author*

## Problem Solving in the Real World

It might be easy to think of having problems as... well, problematic. However, many of the most successful leaders and business people throughout history have used the problems they've encountered as ways to change their lives and our world for the better. In some ways, the hardest thing for most people to do is to recognize that problems are valuable. And the more you can become someone who creates solutions when others cannot, the more successful you'll be.

Whether you're organizing a conference, trying to win a baseball game, or aiming to reach new clients, a strategy is the part of the problem solving process that allows you to think through your course of action to see if it will work. Often too, it's helpful to try out a number of different strategies in order to discover the best way forward. For instance, conference developers might consider a number of different versions of their schedule to create the strongest lineup, a baseball team will

change their batting order to find the most productive offense, and a new technology company will test out different advertisements to see which one gets the most engagement.

The challenging part of applying your problem solving skill in mathematics is that there's no one strategy that will work for you every time. Each strategy is like having a different tool in a toolkit. Some tools are better for different jobs than others. So an important part of building your problem solving skill is to collect as many strategies as possible.

Here are a few specific strategies for you to start practicing and using in MyLab Math:

- **Draw a picture, diagram, or model** to help you see, understand, and think about the problem you want to solve.
- **Find a pattern** to see if you can make predictions about what will happen again and again in the same way.
- **Act out the problem**—even if it's just in your mind—to put yourself inside the situation and understand what choices or next steps might be possible.
- **Work backward** if you already know the end result, but need to find out something that happened earlier.
- **Identify the missing information** so you can consider what you need to accomplish to solve the problem.

You may have already realized that you can apply most of the above strategies to problem solving in your personal or professional life, as well. For example, if you're trying to redesign your children's shared bedroom, drawing a diagram of where you'll put the beds and dressers will probably help you find the best solution. Or, if you're countering a job offer with a higher salary request, acting out the conversation might help you understand how to respond if things don't go your way. Whatever type of problem you're solving, be sure to try out several strategies to see what works best for you.

Remember, part of problem solving is learning from your mistakes. So, if one strategy doesn't help you reach a solution, you can save that knowledge to make you more efficient at solving similar problems in the future.

## Statistics and Problem Solving

Trying to stop the spread of a wildfire is one of the most unpredictable and dangerous jobs on the planet. Yet it's up to firefighters to figure out how to protect valuable nature reserves, as well as homes and businesses that could be destroyed. Luckily, many of today's firefighters are getting a boost from finding ways to gather and use data to predict the path of the blaze. By using satellites that detect weather patterns and analyzing tree types, they can anticipate how wind might push fires in a particular direction, or how different types of leaves might burn faster than others. Using data they

uncover allows firefighters to develop insights that help them make decisions and improve their success. This is just one example of how statistics can power problem solving in the real world.

Understanding how to use statistics in your life and career can help you practice your problem solving skill to put out your own “fires” at home, work, and school. For example, an advertising agency might use statistics to prove one brand of toothpaste is more highly recommended by dentists than another in order to assert that 9 out of 10 dentists recommend this brand. Or a sports fan could use statistics to keep track of a team’s performance by calculating which NFL player has the most tackles or passing yards.

Statistics can also be used to express the mean or average of information. For example, if you spent 6.5 hours actively working in MyLab Math last week, 3.5 hours in MyLab Math this week, and plan to spend 5 hours actively working in MyLab Math next week, then you’re spending an average of 5 hours in MyLab Math each week. When it comes to your education, asking mathematical questions about the data around you, such as “Which subject did you spend the most time studying in the past year?” can help you form a clearer picture of your efforts as a student. Statistics allow us to compare and make interpretations from anything that can be counted in our world: courses, study hours, salaries, populations, jobs, and so on.

No matter what kind of statistics you encounter, all statistics are made up of a particular set of data: the days of the week, the number of views on a YouTube video, the population of a city or country, or even the amount of professional hours you dedicate to a project. In your life, you might track statistics about the food you eat, the music you listen to, or even how many steps you take each day. In your career, you may encounter statistics in research or presentations that are key to your responsibilities or clients.

Here are some of the ways you might use statistics in your personal and professional life:

- To present facts in a definite way. *Example: An average person conducts 3–4 searches online every single day.*
- To make comparisons. *Example: Lime juice may often be more acidic than lemon juice.*
- To make predictions. *Example: There is a 70% chance that the highest flu activity for this season will occur by the end of January.*
- To make complex data easy to see. *Example: The top ten most popular mobile apps by the number of downloads.*

When we better understand the statistics behind different kinds of numbers, such as employment or populations, we can better predict opportunities and outcomes. If you notice, for example, that you spent 80% of your time at work on a minor project, you can make decisions about how to better focus your time in the future. And, you can use those decisions to solve problems every day.

By asking meaningful questions of the statistics we encounter, we can transform our uninformed decisions into informed ones. And that's powerful!

## Informed Decisions with Statistics

In the media and maybe also in your personal and professional life, you are constantly presented with statistics: either graphs representing data or numerical summaries such as averages and proportions or percentages. You might have wondered where this information comes from and why it is important.

## Graphical and Numerical Summaries

In this unit, we survey some methods used in data analysis, specifically the uses of graphs/charts in Section 6–1, and the use of numerical summaries such as mean, median and mode (in Section 6–2) and the standard deviation (in Section 6–3).

To learn more about these topics, read the following:

- *College Mathematics for Trades and Technologies*.
  - Chapter 6, "Statistics:"
    - Section 6–1, "Reading Circle, Bar, and Line Graphs," pages 264–267.
    - Section 6–2, "Measures of Central Tendency," pages 271–277.
    - Section 6–3, "Measures of Dispersion," pages 280–289.
    - Section 6–4, "Counting Techniques and Simple Probabilities," pages 292–298.

## Excel Tutorials

You will create a chart in Excel to calculate statistical measures using a set of data provided in the file AutoData.xlsx. Whether you are a beginner or proficient in Excel, it's a good idea to read these Excel resources:

- *Microsoft Excel 2013 Plain & Simple*:
  - Chapter 6, "Using Formulas and Functions." This chapter explains how to use the statistical functions to generate the desired analysis of your data.
  - Chapter 3, "Getting Started with Excel 2013." If you are new to Excel, this chapter shows you the basics, such as creating a workbook and adding data to a worksheet.
  - Chapter 12, "Summarizing data visually using charts." This chapter walks you through the steps on how to generate charts from your data.
- [Excel Tutorial \[Video\]](#). View this tutorial to help you complete the Excel assignment.

## Math in Real Life

[Top 10 Ways to Use Statistics 100% of the Time \[PDF\]](#). This quick tips sheet gives you 10 ways for using statistics as a problem solving tool. Statistics can help from modeling trends to supporting ideas.

### u06d1 - Ask Your Classmates (Optional)

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 - Calculate Statistical Measures Using Excel

## Overview

In this assignment, you will use data on car prices to create charts in Excel and calculate statistical measures from the data. The data is provided in the [AutoData \[XLSX\]](#) file. It contains information on 82 used cars that are for sale, specifically, the asking price, the model year, the mileage, the color, and the trim.

## Preparation

Follow these steps to prepare for this assignment:

- Download the AutoData.xlsx file.
- Make sure you understand how to create a bar chart, pie chart, and scatterplot. Refer to pages 264–267 of the textbook for information about these charts.
- Make sure you know how to calculate the mean, median, standard deviation, and proportion. Refer to pages 271–290 of the textbook for these statistical measures.

## Instructions

1. (Part 1) Use the information provided in the **AutoData [XLSX]** file to create the following:
  - A bar chart using either the color or trim variable. Make sure you include a title for the plot and label all axes correctly.
  - A pie chart using either the color or trim variable. Make sure you include a title for the plot and label the sectors of the chart correctly.
  - A scatterplot using the miles and asking price. Make sure you include a title for the plot and label all axes correctly.
2. (Part 2) Use the information provided in the **AutoData.xlsx** file to calculate the following:
  - The mean and median for the asking price and miles variables.
  - The (sample) standard deviation for the asking price and miles variables.
  - The proportion of luxury cars and the proportion of performance cars.
3. (Part 3) In a Word document, write a 2–3 paragraph summary of your findings:
  - What are two interesting findings when looking at the charts in Part 1?
  - If you were in the market for buying a vehicle, how would the charts help you make an informed decision?
4. Submit the Word document containing your work for Part 3. Save your file using this convention: **FirstName LastName AutoData.docx** (e.g., Jane Doe AutoData.docx)
5. Submit the Excel file containing your work for Parts 1 and 2. Make sure to save the file using this convention: **FirstName LastName AutoData.xlsx** (e.g., Jane Doe AutoData.xls)

## Competencies Measured

By completing this homework, you will demonstrate your proficiency in the following course competencies and assessment criteria:

Competency 3: Use basic probability and descriptive statistics to solve real-world quantitative problems.

- Create bar chart correctly.
- Create pie chart correctly.
- Create scatterplot correctly.
- Calculate means correctly.
- Calculate median correctly.
- Calculate standard deviations correctly.
- Calculate proportions correctly.

- Apply in text the standard writing conventions for the discipline, including structure, voice, person, tone, and citation formatting.

## u06a2 - Homework for Week 6

### Overview

This week, you read about statistical measures and probabilities. The homework helps to reinforce your learning of these concepts and we encourage you to start the homework early in the week so you won't be rushed; thereby giving you ample time to work through the problems and reach out to your instructor or classmates, if needed.

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 can 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 can see a small green checkmark next to the number of the problem.
- You can save your work at any time by clicking the Save button at the bottom of the problem box.
- You can access and complete each problem as many times as you would like to practice and improve your overall grade for the homework.

### Preparation

You will do your homework each week through MyLab Math. To register, use the access code and instructions bundled with your VitalSource eBook. When you enter your eBook, refer to the pop-up in the right cover to click and reveal your access code for MyLab Math.

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 and Tests. This link takes you to your homework for each week and to the three quizzes.

## Competencies Measured

By completing this homework, you will demonstrate your proficiency in the following course competencies and assessment criteria:

Competency 3: Use basic probability and descriptive statistics to solve real-world quantitative problems.

- Calculate statistical measures and probabilities correctly in most given situations.

### Course Resources

MyLab Math Learner Guide [PDF]

## Unit 7 >> Linear Equations

### Introduction

### Not-so-famous Famous Mathematicians

You have probably heard of these two mathematicians, Albert Einstein and Isaac Newton. There are many other famous mathematicians, and most recently, the stories about two math prodigies were produced giving us a chance to learn about the extraordinary lives of Srinavasa Ramanujan and Katherine Johnson.

#### **Srinivasa Ramanujan (December 22, 1887–April 26, 1920)**

On December 22, 2012, Google changed their logo for a day to honor the 125th birthday of Indian mathematician, Srinivasa Ramanujan. Ramanujan lived during the British rule in India and his mathematical research contributed to mathematical analysis, number theory, infinite series, and continued fractions. He was able to find solutions to mathematical problems thought to be unsolvable. Ramanujan's work contributed to the understanding of black holes.

He is remembered for developing efficient calculation of  $\pi$ ; in fact, his methods were incorporated into computer algorithms allowing

computers to calculate pi to its two quadrillionth digit when expressed in binary. His life is depicted in the 2015 movie, *The Man Who Knew Infinity*.

### **Katherine Johnson (August 26, 1918–February 24, 2020)**

Until the release of the motion picture *Hidden Figures*, in 2017, most Americans had not heard of Katherine Johnson. As a child, she had an affinity to math and was known to count everything in sight. She graduated from West Virginia State College at 18 and eventually was hired by Langley Research Center in Hampton, Virginia., to compute numbers. The astronaut, John Glenn, was said to have more trust in Katherine's manual calculations over the calculations from the computer on the trajectories for his space missions.

Her career spanned 33 years with many groundbreaking contributions to NASA. Katherine Johnson died at age 101.

### **References:**

Srinivasa Ramanujan. (n.d.). In *Encyclopaedia Britannica*.  
<https://www.britannica.com/science/number-theory/Prime-number-theorem>

Bote. J. (2020, February 24). 'Hidden Figures' mathematician Katherine Johnson, who broke barriers at NASA, dies at 101. *USA Today*.  
<https://www.usatoday.com/story/news/nation/2020/02/24/katherine-johnson-nasa-mathematician-hidden-figures-dead-101/4856078002/>

*"Success is going from failure to failure without losing enthusiasm."*

*--Winston Churchill, Prime Minister*

In the workplace, problem solving strategies can help you interact with customers, peers, and clients, meet deadlines, and even reach leadership or management positions. And in your personal life, they can help you alleviate stress, overcome relationship challenges, and achieve your goals.

That doesn't mean you won't encounter setbacks or make mistakes from time to time. You might be faced with a client who keeps canceling meetings, or you may score a lower grade than you were expecting on an important quiz or assignment. But by applying the strategies and tools from this

course, you'll be able to identify your mistakes and use your problem solving skill to avoid those same mistakes in the future.

This week, you'll learn additional strategies to hone your problem solving skill while learning about linear equations. Take time to learn from your mistakes so you can use them to build your confidence to take on challenges in this course and beyond.

### To-Do List:

- **What You Need to Know:** Read about linear equations and inequalities.
- **Quiz:** Complete Quiz 2, which covers materials from Weeks 4–6.

## Learning Activities

### u07s1 - Activity Overview

## Assignment Overview

This week we are covering what you need to know about linear equations. Section 7–1 covers the variables involved in a linear equation, and Section 7–2 and 7–3 cover how you can solve linear equations.

## Quiz Overview

You will complete the second quiz of the course this week. The quiz covers the material in Weeks 4 to 6 and is done using MyLab Math.

### u07s2 - What You Need to Know

*"I don't believe in failure. It's not failure if you enjoyed the process."*

*--Oprah Winfrey, Entertainment Icon*

## Learn from Mistakes

In the real world, problem solving often involves a lot of getting things wrong before you get them right. So it's easy to see why many people worry about failure until you start to consider that it's actually a necessary part of success.

Media mogul Oprah Winfrey is a great example of someone who didn't start out "getting things right." Before building her entertainment empire, Winfrey overcame a difficult upbringing to earn a successful college degree. After college, she fought racial discrimination in the workplace to become a primetime news anchor. And, later, she survived a painful demotion when her first solo show tanked!

Even though Oprah looks back on these years as filled with failures, she also sees how they helped her shape and reach her goals. Rather than giving up, Oprah kept honing her ability to overcome any problem that held her back. And you can use the same skill to defeat challenges in your own life and career.

What we call "failure" is a normal part of life. It's how we learn to do better the next time around. When it comes to your problem solving skill, understanding how you can use your setbacks to solve future problems in this course and beyond will help you continue to succeed in the face of adversity. And one of the best ways you can adjust to obstacles is by changing your problem solving strategy, or how you go about finding a solution to reach your goal.

Check out the strategies below and consider how you could use them in MyLab Math and in your personal or professional life this week:

### **1. Use logical reasoning.**

Logical reasoning is a strategy that involves using systematic, rational steps to draw conclusions. When you solve a problem using logical reasoning, you're relying on truths and principles you already know and understand to come up with a solution. Word problems are a great place to practice your logical reasoning strategy, but you can also use logical reasoning outside of this course to solve problems every day.

*For example, if you're trying to decide the best way to get to a meeting across town at rush hour, you might choose biking over driving and public transit. You would base this decision on your past experience driving at rush hour and your understanding of how quickly you can ride your bike.*

### **2. Make an organized list or table.**

You've already learned how organizing can help make you more productive in this course and your career, but it's also a strategy for your problem solving skill. That's because organizing information can help you sort data in the way that's easiest to understand, which will also help you work out a solution. Try using this strategy in situations like tracking and comparing changes in temperature or prices. It will work best in problems where there are a lot of different data points.

### 3. Guess and check.

What do you do when you don't know the answer? Try guessing and checking! For this strategy, you should use the information you already know to guess the answer and then check to see if it meets the parameters of the problem. Be sure to use educated guesses in order to make this strategy effective.

*For example, let's say you know that a kindergarten class is made up of 5-year-olds. And the total age of all the students is 75 years. You know there are more than 8 children in the class, but less than 20. To problem solve the total number of students in the class, you could try guessing numbers between 8 and 20 and doing the math until you reach the correct answer.*

No matter what challenges you face in your life and career, practicing problem solving strategies can help you reach successful solutions. Keep practicing the strategies you're learning in MyLab Math. If one strategy doesn't work, try another. And, remember, failure is a healthy and normal part of the problem solving process. Even when you make mistakes, you're growing your problem solving skill, which will help you continue to reach success in the future!

## Linear Equations: Straight-Line Growth

We are all exposed to growth (or decline processes) in everyday life. One example is how many miles you travel (or how many gallons of gas you burn) in a given unit of time. If this rate is constant, you are looking at a linear equation.

## Linear Equations

In this unit, we focus on linear equations. Along the way, you will see many everyday examples of situations in which linear equations occur. As you work through these problems, think about how you might encounter similar situations in your life.

To learn more about the systems of measurement you will use in this course, read the following:

- *College Mathematics for Trades and Technologies.*
  - Chapter 7, "Linear Equations and Inequalities:"
    - Section 7–1, "Variable Notation," pages 316–321.
    - Section 7–2, "Solving Linear Equations," pages 323–334.
    - Section 7–3, "Solving Linear Equations with Fractions and Decimals by Clearing the Denominators," pages 336–346.

### Course Resources

Cleaves, C., & Hobbs, M. (2019). *College mathematics for trades and technologies with MyLab for Math online access [custom bundle] (10th ed.)*. New York, NY: Pearson Learning Solutions. ISBN:9780136796756.

### u07d1 - Ask Your Classmates (Optional)

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.

### u07a1 - Quiz 2

## Overview

In the last few weeks, you have read about and practiced problems dealing with measurements, operations with signed numbers, and calculations with powers of 10. You now have an opportunity to test your skills on these concepts.

## Preparation

You can prepare by following these suggestions:

- Review the readings from Weeks 4–6.
- You have two chances to take the quiz (the higher score counts).
- Allocate sufficient time to ensure you will be able to complete the quiz within the allotted time. There is a 120-minute time limit for the quiz.
- Remember that you cannot stop and restart the test. 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.

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

## Instructions

To access the quiz:

1. Sign into MyLab, and go to the Homework and Tests link.
2. Select **Quiz 2**, which is located in the middle of the page.
3. Before starting, make sure you read the instructions and reminders located on the “Are you ready to start” page.
4. Once you are ready to start the quiz, click “I am ready to start”, which is located on the right-hand side of the page.
5. 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.

## Competencies Measured

By completing this homework, you will demonstrate your proficiency in the following course competencies and assessment criteria:

Competency 2: Use basic arithmetic and algebra to solve real-world quantitative problems.

- Solve application problems involving the U.S. customary system of measurement.
- Identify uses of metric measures of length, mass, weight, and capacity.
- Solve application problems involving the metric system.
- Convert between Fahrenheit temperatures and Celsius temperatures.
- Solve application problems involving conversion between U.S. customary and metric measures.
- Add signed numbers with like signs.
- Add signed numbers with unlike signs.
- Combine addition and subtraction of signed numbers.
- Solve application problems involving adding or subtracting signed numbers.
- Evaluate powers of signed numbers.
- Solve application problems involving multiplying or dividing signed numbers.
- Apply the order of operations with signed numbers.
- Change a number from scientific notation to ordinary notation.
- Change a number from ordinary notation to scientific notation.

Competency 3: Use basic probability and descriptive statistics to solve real-world quantitative problems.

- Read circle graphs.
- Read bar graphs.
- Find the arithmetic mean.

- Find the range.
- Find the standard deviation.
- Determine the probability of an event occurring if an activity is repeated over and over.

## Course Resources

MyLab Math Learner Guide [PDF]

## Unit 8 >> Formulas and Proportions

### Introduction

## The Meaning of Googol

Because of the ubiquitous Google search engine, when you hear “Google” you know it means to search for information on the Internet. Have you ever stopped to wonder how Sergey Brin and Larry Page, the founders of Google, came up with the name?

The story is this: the American mathematician Edward Kasner’s 9-year old nephew came up with the word “googol” when Kasner asked his nephew to help him name the number of 10 to the 100th power.

Brin and Page’s “Google” comes from the made-up word “googol” because they wanted a word that represented the power of their search engine needing to filter through a vast amount of information. They were great computer scientists but terrible spellers—they misspelled the word and that’s how “googol” became Google.

### References:

Merriam-Webster. (n.d.). Googol. In *Merriam-Webster.com dictionary*. <https://www.merriam-webster.com/dictionary/googol>

Heavy.com. (n.d.). *Google: The Story Behind the Search Engine’s Invention*. <https://heavy.com/news/2019/09/google/>

*"The longer I go, the more I am aware of the power of finance."*

*--Justin Welby, Archbishop of Canterbury*

If you've ever struggled to fill out a tax return, had to put back an expensive item at the grocery store, or packed your lunch to save cash, you already understand the challenge of managing your personal finances. Even if it isn't your primary concern, the life you live is shaped by your financial freedom. And the problem solving skill you're learning can help you win that freedom!

Throughout this course, you've begun investing in yourself by developing your problem solving skill so you can make successful decisions in this course and your career.

This week, you'll learn how to apply the same problem solving skill to start mastering formulas. You will also learn more about how to apply some of the data analysis skills learned in Week 6 to your own life. You'll see how mathematics can help you build a future you can count on.

#### To-Do List:

- **What You Need to Know:** Read about formulas and proportions, including direct and joint variation, and inverse and combined variation.
- **Discussion:** Use Excel to calculate various quantities found in a monthly budget.
- **Assignment:** Complete the assigned MyLab Math problems. The problems you will work through are on formulas and proportions.
- **Interactive Learning Module:** Listen to Nicole Lapin's explanation of the use of math to decide between buying or leasing a car.

## Learning Activities

### u08s1 - Activity Overview

## Discussion Overview

This week's discussion covers how to use formulas in Excel. You have already used Excel for the project in Week 6, so some of this should be familiar. Review page 384 of your *College Mathematics for Trades and Technologies* text for additional information.

## Assignment Overview

This week we are covering what you need to know about formulas, proportions and how two quantities can depend on each other. These skills are introduced this week using MyLab Math, and later, in Unit 10, you will be tested on your knowledge in Quiz 3.

## u08s2 - What You Need to Know

*“Opportunity is missed by most people because it is dressed in overalls and looks like work.”*

*--Thomas Edison, Inventor*

## Data Analysis and Decision-Making

If you’ve ever procrastinated before a big assignment or put off having a difficult conversation with a friend or coworker, you know how easy it is to avoid facing problems in your life when you feel overwhelmed, uncomfortable, or don’t know where to start. But, it’s essential that we stop seeing problems as barriers and instead see them as opportunities to grow and improve.

In Week 6, you completed a data analysis assignment. This week and beyond, consider how to apply these concepts to everyday life. We may all use math to solve different problems in our lives and careers, but every single one of us has to make important financial decisions from time to time. Those decisions could involve planning for your retirement, deciding which home loan to apply for, or contributing to an investment fund or health savings plan. The mathematical concepts you’re learning in this course will help you build the problem solving skill you need to make these tricky financial decisions, from how long it takes to pay off a debt to how much you need to save to buy a new car.

You’ve already learned problem solving strategies such as looking for patterns, using logical reasoning, guessing and checking, and working backward to make decisions in this course and your regular life. Now, you can apply these same strategies to solving problems in your personal finances, including:

- Calculating monthly payments to pay off your credit cards or debt faster.
- Exploring how much interest you’ll be paying on a car loan.
- Comparing the cash flow (money earned vs. money spent) of your household (or business).

- Calculating the present or future value of an annuity (like a mortgage or pension) to see how much your money will be worth in the future.
- Forecasting your expected returns on a portfolio of investments.

In order to apply these problem solving strategies to your personal finances, you'll need to use data analysis. Data analysis is the process of interpreting data in meaningful ways. In data analysis, you can take the same set of information and look at it in different ways so you can use it to make decisions and solve problems.

For example, you might decide to look for patterns in your household budget to see if there's extra money you can save for your child's college tuition. Using this problem solving strategy and data analysis, you may discover you are spending less money on gas by taking the bus to work every week. This might help you decide to contribute the money you are saving to your child's fund.

There are, of course, many other ways to apply data analysis to solving personal financial problems. So, don't be afraid to explore the concepts you're learning in MyLab Math to analyze real data and start earning your financial freedom.

## Finding Answers with Formulas

One of the most common applications of math is the use of formulas. In a formula, the quantity to be determined (the unknown or output variable) appears on the left side of an equation, and some combination of the known variables (or input variables) appears on the right side of the equation. In other words, formulas are easy to use, because they are already solved for the quantity you like to determine, which can be found by "plugging in" the formula.

For example, if you travel at a constant speed  $v$  (say 60 miles per hour) for a given period of time  $t$  (in hours), then the formula for distance  $d$  (in miles) traveled is:

$$d = v * t = 60 * 2 = 120$$

## Formulas and Proportions

In this unit, we focus on solving real-world problems using formulas. Many formulas involve proportions or represent how certain variables are related.

To learn more about these topics, read the following:

- *College Mathematics for Trades and Technologies*.
  - Chapter 8, "Formulas, Proportion, and Variation:"
    - Section 8–1, "Formulas," pages 378–384.
    - Section 8–2, "Proportion," pages 387–388.

- Section 8–3, "Direct and Joint Variation," pages 390–395.
- Section 8–4, "Inverse and Combined Variation," pages 398–404.

## u08d1 - Write Your Discussion Post

Emily and Rob are using an Excel spreadsheet to keep track of their monthly expenses. This information can be found in the Excel file "Emily and Rob's Budget.xlsx."

In this assignment, you will use Excel formulas to calculate various quantities in the sheet. Refer to page 384 of the textbook for information.

Address the following questions:

1. Enter a formula in cell B12 that calculates the total monthly budget; also, calculate the percent of the total budget for each expense item and enter the formulas into cells C2 to C10. Submit the completed Excel file with your discussion post.
2. Provide a second Excel file with a similar example. Explain what the example is about and how it relates to your personal or professional life. You may use a budget example, but any other situation involving the use of formulas in Excel is welcome.

## Response Guidelines

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

- How similar are your results to those of your peers, and in which ways are they different?
- Consider similarities and differences between your examples and those of your peers. Can you relate to the examples presented by your peers?

### Course Resources

Undergraduate Discussion Participation Scoring Guide

## u08a1 - Homework for Week 8

### Overview

This week, you read about formulas and proportions. The homework helps to reinforce your learning of these concepts and we encourage you to start the homework early in the week so you won't be rushed; thereby giving you ample time to work through the problems and reach out to your instructor or classmates, if needed.

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 can 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 can see a small green checkmark next to the number of the problem.
- You can save your work at any time by clicking the Save button at the bottom of the problem box.
- You can access and complete each problem as many times as you would like to practice and improve your overall grade for the homework.

### Preparation

You will do your homework each week through MyLab Math. To register, use the access code and instructions bundled with your VitalSource eBook. When you enter your eBook, refer to the pop-up in the right cover to click and reveal your access code for MyLab Math.

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 and Tests. This link takes you to your homework for each week and the three quizzes.

### Competencies Measured

By completing this homework, you will demonstrate your proficiency in the following course competencies and assessment criteria:

Competency 2: Use basic arithmetic and algebra to solve real-world quantitative problems.

- Performs operations involving formulas and proportions correctly in most given situations.

## u08v1 - Interactive Learning Module: Capella Stories - Problem Solving with Data: Buying vs. Leasing a Car with Nicole Lapin

You use math to solve everyday problems. So why not use it to assist you with your personal finances? Whether you're deciding which loan to apply for or figuring out the best way to pay off your debt, strengthening your problem solving skills is your secret weapon to making successful decisions. When picking out a new ride, many people struggle between the option of buying versus leasing a vehicle. In this week's Capella Stories, financial expert Nicole Lapin helps you practice your problem solving skill to decide between buying and leasing a car. That's knowledge you can drive all the way to the bank!

### Unit 9 >> Graphing Linear Equations

#### Introduction

#### The Fields Medal

Scientists, poets, doctors, and politicians who devote their life's work to their discipline dream of winning a Nobel Prize in their field.

For mathematicians, the ultimate prize is the Fields Medal, awarded by the International Mathematical Union, an international scientific organization. The IMU is a nonprofit scientific organization dedicated to promoting international collaboration in the field of mathematics.

The Fields Medal is awarded every four years to recognize outstanding achievements and promising work that expands the field of mathematics. A Field Medal hopeful must be under the age of 40. At each award symposium, there can be up to four medals awarded with a cash prize of CAD 15,000 (Canadian dollars.)

**References:**

International Mathematical Union. (n.d.) *Fields medal*.  
<https://www.mathunion.org/imu-awards/fields-medal>

*“The most important questions in life are...really only problems of probability.”*

*--Pierre-Simon Laplace, Scholar*

Part of problem solving isn't always about finding an answer, but understanding what you think might happen. How likely is it to rain during your commute? What are your chances of picking a winning lottery number, or getting a raise? When we talk about the likelihood of something happening or not, what we're really referring to is probability. And understanding how to calculate probable outcomes can be a useful tool in this course and beyond.

This week, you'll learn how using probability in real-world situations can help you accomplish more than just remembering your umbrella. It can strengthen your problem solving skill so you can make important decisions about your life and future. You will also learn more about probability and problem solving by graphing linear equations. These graphs can be used as models for many real-world situations.

**To-Do List:**

- **Discussion:** Use a scatterplot graph to calculate slope and intercept of the line and explain how graphs can be used to show relationships between information.
- **What You Need to Know:** Read about formulas, proportion, and variation.
- **Assignment:** Complete the assigned MyLab Math problems. Your problem sets will ask you to use linear models to solve real-world problems.

**Learning Activities****u09s1 - Activity Overview****Discussion Overview**

This week's discussion will introduce you to a concrete example of using a straight line for modeling. This model can be obtained from data. Review Section 9–3 and 9–4 of your *College Mathematics for Trades and Technologies* text for additional information.

## Assignment Overview

This week we are covering what you need to know about graphical representations of linear equations. These skills are introduced this week using MyLab Math, and later, in Week 10, you will be tested on your knowledge in the last quiz.

### u09s2 - What You Need to Know

*"I have no certainties, at most probabilities."*

*--Renato Caccioppoli, Mathematician*

## Solving Problems with Probability

You've learned how to solve problems across this course, in your career, and in your life, but how do you determine the likelihood of how things might turn out? Can you really learn to predict the future?!

If you've ever taken a road trip, you've probably made predictions on when you'll need to stop for gas. Or if you've cared for a small child, you might understand the importance of bringing extra diapers and clothing wherever you go. You don't know if your child will need an extra diaper, but you think it's very likely based on your experiences caring for them. Our brain's ability to make predictions like these using probability is one of the most important decision making techniques in the real world. When outcomes are uncertain, understanding probability helps us avoid making wild guesses because we'll know whether or not they're likely to come true. Practicing probability to make smarter decisions will ultimately help us solve problems in our personal and professional lives.

In the workplace, you will often need to set and achieve goals, such as designing or launching a new project. To stay on track, you and your team need to be able to use information about the project to predict how successful different choices might be.

For example, marketers often test an 'A' version and a 'B' version of a particular ad campaign with a small group of viewers. They test the two versions to gather data about which one will have more impact. When they see which choice has more views or engagement, they can assume it is very likely or probable that this same choice will have similar results with a larger audience. That makes their decision on which ad to use a lot easier! Whether you're trying to avoid traffic, rain, or a professional

pitfall, confident decision making starts with being able to use the information to ask questions, consider your options, and predict results.

## Straight-Line Models

In Week 7, you encountered linear equations. These had only one variable, usually called “ $x$ ” and you learned how to solve these equations for that variable. In this section we consider linear equations with two variables, “ $x$ ” and “ $y$ .” In a real-world context, these linear equations express how these two variables are related.

But we can do a lot more with these linear equations: we can graph them. In order to do this, you will first learn how to plot individual points, and the graph of a linear equation then consists of all points ( $x$ ,  $y$ ) that satisfy the linear equations. As it turns out, the graphs of linear equations are all straight lines.

## Graphing Linear Equations

In this unit, we focus on graphing linear equations and using linear models to solve real-world problems. Graphing linear equations simply involves plotting two points, and connecting them with a straight line.

To learn more about these topics, read the following:

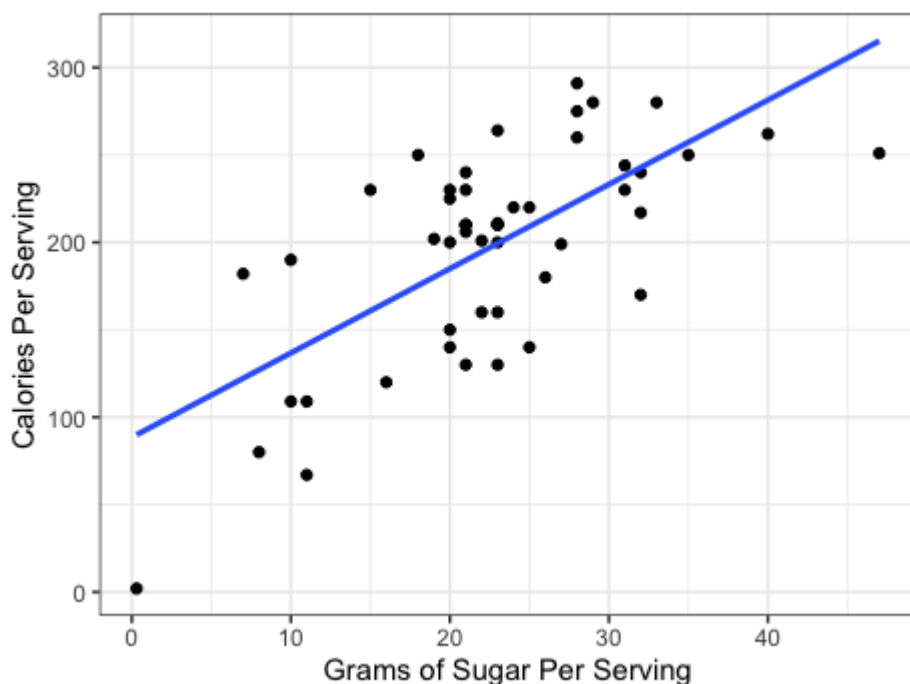
- *College Mathematics for Trades and Technologies*.
  - Chapter 9, "Linear Equations, Functions, and Inequalities in Two Variables:"
    - Section 9–1, "Graphical Representation of Linear Equations and Functions," pages 416–425.
    - Section 9–2, "Graphing Linear Equations in Two Variables Using Alternative Methods," pages 427–438.
    - Section 9–3, "Slope," pages 439–443.
    - Section 9–4, "Linear Equation of a Line," pages 445–452.

### Course Resources

Cleaves, C., & Hobbs, M. (2019). *College mathematics for trades and technologies with MyLab for Math online access [custom bundle] (10th ed.)*. New York, NY: Pearson Learning Solutions. ISBN:9780136796756.

### u09d1 - Write Your Discussion Post

Image of a scatterplot graph with "grams of sugar per serving" as x-axis and "calories per serving" as y-axis with trend line at about a 30 degree angle from lower left to upper right.



In this discussion, you will find the equation of the line and use the equation for prediction. Refer to pages 446-447 of the textbook for more information.

Address the following questions:

1. Find the coordinates of two points that lie on the line and calculate the slope and the intercept of the line.
2. Use the equation in part 1 to predict the amount of calories from knowing the amount of sugar. For example, if a candy has 30 grams of sugar per serving, what is the corresponding number of calories per serving?
3. Find a graph of a straight line to provide a similar example. Explain what the example is about and how it relates to your personal or professional life. Again, use two points to find the equation of the line and use the line to predict the y-coordinate from a given value of the x-coordinate.

## Response Guidelines

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

- How similar are your results to those of your peers? In which ways are they different?
- Consider similarities and differences between your examples and those of your peers. Can you relate to the examples presented by your peers?

## Course Resources

### Undergraduate Discussion Participation Scoring Guide

## u09a1 - Homework for Week 9

### Overview

This week, you read about graphing linear equations and using linear models to solve real-world problems. The homework helps to reinforce your learning of these concepts and we encourage you to start the homework early in the week so you won't be rushed; thereby giving you ample time to work through the problems and reach out to your instructor or classmates, if needed.

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 can 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 can see a small green checkmark next to the number of the problem.
- You can save your work at any time by clicking the Save button at the bottom of the problem box.
- You can access and complete each problem as many times as you would like to practice and improve your overall grade for the homework.

### Preparation

You will do your homework each week through MyLab Math. To register, use the access code and instructions bundled with your VitalSource eBook. When you enter your eBook, refer to the pop-up in the right cover to click and reveal your access code for MyLab Math.

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 and tests. This link takes you to your homework for each week and to the three quizzes.

## Competencies Measured

By completing this homework, you will demonstrate your proficiency in the following course competencies and assessment criteria:

Competency 2: Use basic arithmetic and algebra to solve real-world quantitative problems.

- Performs operations with straight lines correctly in most given situations.

### Course Resources

MyLab Math Learner Guide [PDF]

## Unit 10 >> Systems of Linear Equations

### Introduction

#### Math Fluency

Professor Jo Boaler, of Stanford University, researched the best ways to teach and learn math. If you thought math was a memory exercise, she counters with the opposite—that participation in math should be to develop math fluency, not math memorization. For example, when we study English, we don't focus on memorizing the meaning of words, but what the words mean when they are used in a sentence, spoken out loud, used in poetry and so on.

Developing math fluency, or having a good "number sense," means you understand numbers in a flexible way. For example, take  $21 - 16$ . If you re-framed it to be  $20 - 15$ , it's easier to compute rather than starting at 21 and counting backwards 15 times until you reached 5.

Professor Boaler's research encourages teachers to teach math in a way that inspires flexible thinking and for students to approach it like other subjects. Her observations of mathematicians have shown they are not particularly fast with math facts and take the time to think deeply and carefully about mathematics.

**References:**

Stanford Graduate School of Education. (n.d). Research stories.

<https://ed.stanford.edu/news/learning-math-without-fear>

<http://youcubed.stanford.edu/fluency-without-fear/>

*“Mathematics is not about numbers, equations, computations, or algorithms: it is about understanding.”*

*--William Paul Thurston, Mathematician*

Whether you're buying a house, planning your retirement, running a school fundraiser, or calculating a budget for your boss, having a clear understanding of the numbers and equations that make up your world is essential to expanding your success at home, work, and school.

Over the past 10 weeks, you've practiced mathematical strategies that you can apply to this course and beyond. And, you've used these strategies to hone your productivity and problem solving skills. You've also explored how these two skills will help you achieve your personal, academic, and professional goals.

This week you will learn about linear equations and look back at how you learned how to hone your problem solving and productivity skill.

**To-Do List:**

- **What You Need to Know:** Read about how to solve systems of linear equations using multiple methods.
- **Assignment:** Complete the assigned MyLab Math problems. Your homework will be focused on operations involving systems of linear equations.
- **Quiz:** Complete Quiz 3, which covers materials from Weeks 7–9.

**Learning Activities****u10s1 - Activity Overview****Assignment Overview**

This week we are covering what you need to know about systems linear equations. Sections 10–1, 10–2 and 10–3 cover the mathematical aspects of solving systems of linear equations, and Section

10–4 presents how these systems appear in real-world situations.

## Quiz Overview

You will complete the third quiz of the course this week. The quiz covers the material in Weeks 7–9 and is conducted using MyLab Math.

### u10s2 - What You Need to Know

## Looking Back

While mastering mathematics can take a lifetime of practice, this course has given you proven ways to apply math to any problem in your life or career. And these same concepts have helped you hone two essential employability skills to take control of your academic and professional future. They are:

- **Productivity** to learn organizational strategies that can make you more efficient and effective in this course and beyond.
- **Problem Solving** to analyze the data around you so you can work through and overcome everyday challenges.

Honing these two skills will help you more easily organize information, set goals, strategize, tackle big decisions, and accomplish critical tasks.

## Systems of Linear Equations: Intersecting Lines

In the previous unit, you saw that the graph of a linear equation is a straight line. If you graph two (or more) straight lines, you might be interested in their intersection. This graphical problem is related to solving a system of two (or more) linear equations.

## Systems of Linear Equations

In this unit, we focus on systems of linear equations. Along the way, you will see many everyday examples of situations in which linear equations occur. As you work through these problems, think about how you might encounter similar situations in your life.

To learn more about the systems of measurement you will use in this course, read the following:

- *College Mathematics for Trades and Technologies.*
  - Chapter 10, "Systems of Linear Equations, and Inequalities:"
    - Section 10–1, "Solving Systems of Linear Equations and Inequalities Graphically," pages 469–471.
    - Section 10–2, "Solving Systems of Linear Equations Using the Addition Method," pages 472–476.
    - Section 10–3, "Solving Systems of Linear Equations Using the Substitution Method," pages 477–479.
    - Section 10–4, "Problem Solving Using Systems of Linear Equations," pages 480–482.

### u10d1 - Ask Your Classmates

In this course, you have learned how the skills of problem solving and productivity will help you more easily organize information, set goals, strategize, tackle big decisions, and accomplish critical tasks. How can you take what you learned in this course and use these skills in the future?

### u10a1 - Homework for Week 10

## Overview

This week, you read about operations involving systems of linear equations. The homework helps to reinforce your learning of these concepts and we encourage you to start the homework early in the week so you won't be rushed; thereby giving you ample time to work through the problems and reach out to your instructor or classmates, if needed.

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 can 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 can see a small green checkmark next to the number of the problem.
- You can save your work at any time by clicking the Save button at the bottom of the problem box.
- You can access and complete each problem as many times as you would like to practice and improve your overall grade for the homework.

## Preparation

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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 and Tests. This link takes you to your homework for each week and the three quizzes.

## Competencies Measured

By completing this homework, you will demonstrate your proficiency in the following course competencies and assessment criteria:

Competency 2: Use basic arithmetic and algebra to solve real-world quantitative problems.

- Performs operations involving systems of linear equations correctly in most given situations.

### Course Resources

[MyLab Math Learner Guide \[PDF\]](#)

## u10a2 - Quiz 3

## Overview

In the last few weeks, you have read about and practiced problems regarding linear equations, formulas and proportions, graphing linear equations, and systems of linear equations. You now have an opportunity to test your skills on these concepts.

## Preparation

You can prepare by following these suggestions:

- Review the readings from Weeks 7–10.
- You have two chances to take the quiz (the higher score counts).
- Allocate sufficient time to ensure you will be able to complete the quiz within the allotted time. There is a 120-minute time limit for the quiz.
- Remember that you cannot stop and restart the test. 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.

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

## Instructions

To access the quiz:

1. Sign into MyLab, and go to the Homework and Tests link.
2. Select Quiz 3, which is located in the middle of the page.
3. Before starting, make sure you read the instructions and reminders located on the “Are you ready to start” page.
4. Once you are ready to start the quiz, click “I am ready to start,” which is located on the right-hand side of the page.
5. 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.

## Competencies Measured

By successfully completing this homework, you will demonstrate your proficiency in the following course competencies and assessment criteria:

Competency 2: Use basic arithmetic and algebra to solve real-world quantitative problems.

- Translate verbal statements into symbolic statements using variables.
- Solve application problems involving equations.

- Solve linear equations that contain parentheses.
- Solve complex linear equations that contain parentheses.
- Solve complex application problems involving equations.
- Solve fractional equations by clearing the denominators.
- Solve applied problems involving decimal equations.
- Evaluate formulas involving the simple interest formula.
- Evaluate formulas involving a markup formula.
- Solve equations that are proportions.
- Solve problems of direct variation using proportions.
- Locate points on a rectangular coordinate system.
- Make a table of solutions for a linear equation or function.
- Graph a linear equation or function using a table of values.
- Solve applications using linear equations in two variables.
- Determine the slope and y-intercept of an equation.
- Solve applications involving rate of change.
- Find the equation of a line, given two points on the line.
- Find the equation of a line, given the slope and y-intercept.
- Identify the slope and the y-intercept from a given line.