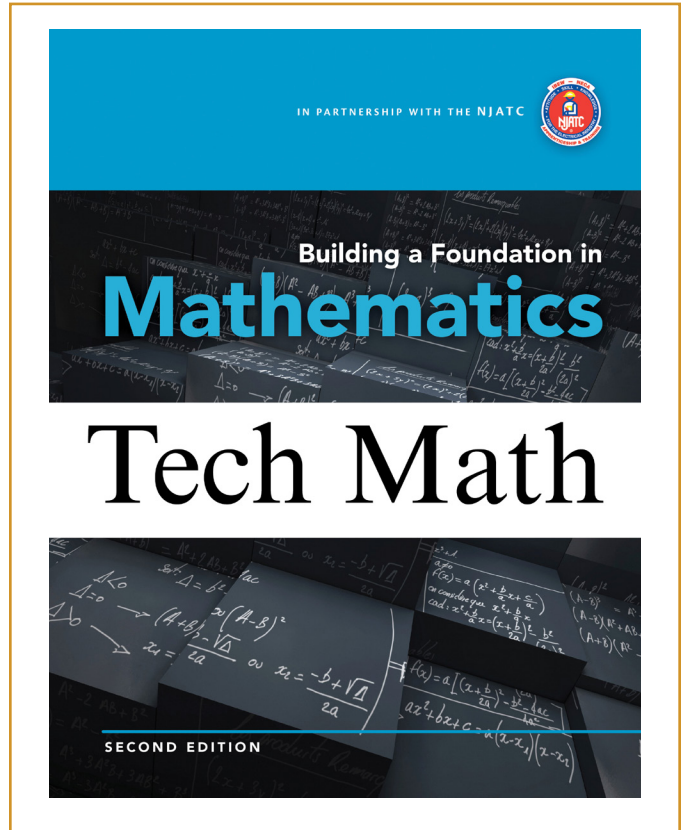


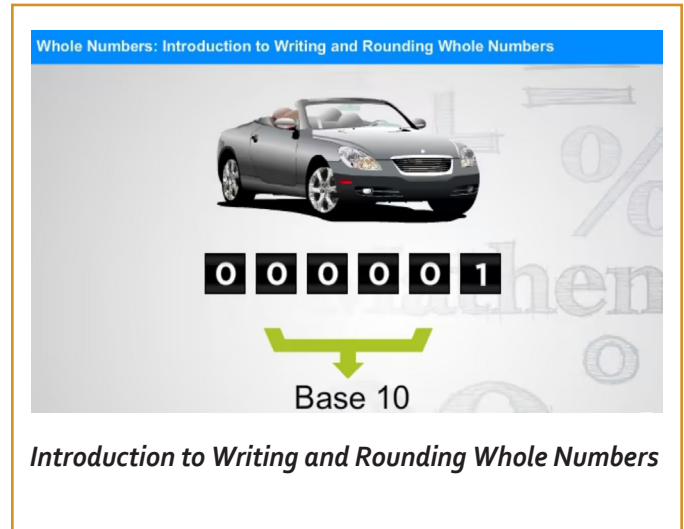
COURSE DESCRIPTION

Many skills are required to successfully complete the electrical apprenticeship program and be able to function as a competent Journeyman. One such skill is the ability to apply standard mathematics in the classroom as well as on the job. The Tech Math course provides a review of necessary mathematical skills which are crucial to anyone working in the electrical trade. Topics include operations with whole numbers, integers, fractions, decimals, ratios, exponents, and units and measurements.



LESSON 1: Whole Numbers

Welcome to Lesson 1 of your Tech Math course. If you have not had the chance to or taken the time to review the Preface of your Building a Foundation in Mathematics textbook, please take the opportunity to do so now. A perspective about this course is shared there that should have great value to you. This and the following lessons cover the foundational mathematical concepts that serve as the essential means for the building of everything around you. While the immediate goal for you in this training may be to get to the end of it, be sure to make every effort to verify you have acquired sufficient knowledge of each learning objective in this course. Whether the lessons are a review or the topics are brand new, engage with each component to maximize your results in this training. Be sure to read all the information presented on these introductory information sections. Besides insight to what you will be covering, you will also see tips about specific items in that lesson. Understanding these tips can save a great deal of time and possible frustration from occurring.



The question types used in this course may take you a moment to get used to. Be sure you have watched the videos for the course and read the questions carefully. You may review these resources at any time.

You begin your training on whole numbers. Whole numbers are the set of numbers 0, 1, 2, 3, 4, 5 and so forth. They contain no fractions or fractional parts. The whole numbers form the basis of the numerical system, along with the operations of addition, subtraction, multiplication, and division. The basic skills used to work with whole numbers are the same skills employed later in more complex operations. Developing a solid foundation now will allow you to build on skills later with absolute confidence.

While reviewing the training Module, be sure to pay close attention to the videos and note the steps for each calculation. Completing the quizzes, hoping to learn the material contained in them, then reviewing the text and videos when you are stumped is not a solid way to learn the material.

Please see your first Pro Tip below.

Pro Tip:

- Note the reference for this lesson identifies Chapter 1 of the text. It is important, and a part of the training, to review the chapters along with each lesson. Practice with the examples in the videos and the text to verify understanding and build your confidence. Only begin the quiz once you are sure you have mastered each skill covered in each lesson. You may attempt the lesson quiz as many times as you like.

Learning Objectives

After completing this lesson, you will be able to:

1. Demonstrate skill in the basic operations of addition, subtraction, multiplication, and division of whole numbers, including regrouping.
2. Develop skills in interpreting and solving word problems using whole numbers.

LESSON 2: Fractions

Fractions are regularly used throughout life, and so it is important to be as comfortable in working with fractions as it has become working with whole numbers. For example, in measuring for the installation of equipment, an Electrical Worker uses a ruler that is divided into fractional parts. Many times, the readings taken or computed require addition, subtraction, multiplication, and/or division of fractions to produce usable information. In another instance, an Electrical Worker will have a recipe for lasagna that serves eight people, but the party plans include 12 people for dinner. How much of each ingredient do you need?



Fractions are a part of life, and it is essential that fractions and how to work with them efficiently be understood. As with whole numbers, this lesson covers the basic operations involved in using fractions.

While reviewing the training module, be sure to pay close attention to the videos and note the steps for each calculation. Follow along in the textbook to learn the process for inputting values and making calculations. Practice the examples shown in the videos and the text prior to attempting each quiz for better retention and to build your confidence. And remember that you may attempt the lesson quiz as many times as you like!

In the quiz for this lesson, all answers must be formulated as fractions – you will not be able to input answers as decimals for this lesson. All fractions in quiz answers should be reduced to their lowest terms.

Pro Tip:

It can be very useful to think about how you could draw a picture of what is being shared in mathematical word problems. At a minimum, you should look to extract all useful information from word problems and write it out onto a notebook or scratch paper. Practice identifying exactly the variable being asked for as well as the variables and values being given in the problem, and look to identify words that can act as mathematical operators. People who struggle with word problems tend to try to do too much in their head and not enough out on the page.

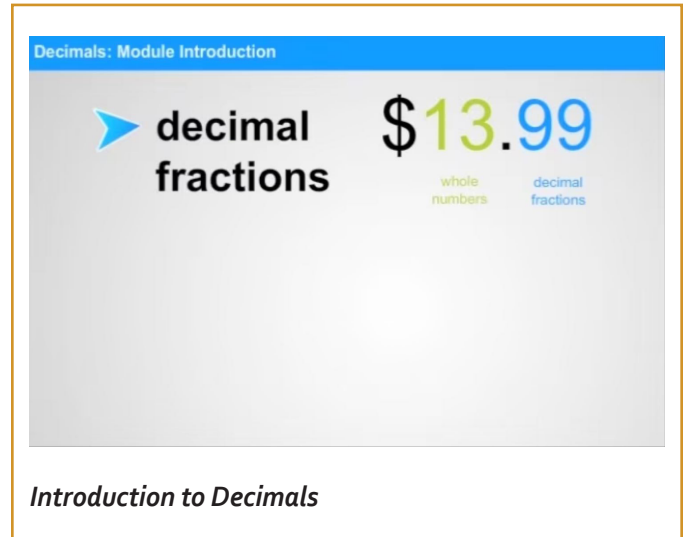
Learning Objectives

After completing this lesson, you will be able to:

1. Demonstrate skill in working with proper fractions, improper fractions, and mixed numbers to achieve the correct form required to solve specific problems.
2. Demonstrate the ability to add, subtract, multiply, and divide numbers with fractions.
3. Develop skills in solving word problems involving fractions.
4. Develop skills in reducing fractions to their simplest form.

LESSON 3: Decimals

Fractions are only one way of expressing parts of whole numbers; decimals are another. Addition, subtraction, multiplication, and division of decimals will be reviewed. Depending on the application, either fractions or decimals may be used to represent the same information, and in some cases, it is necessary to convert from decimal values to fractions or from fractions to decimals. Decimals are fractions themselves. In the base 10 numbering system, each digit in a decimal number represents its value times a defined power of 10 (place values). For example, the decimal part of 35.278 can be written as $\frac{2}{10} + \frac{7}{100} + \frac{8}{1000}$.



In working with decimals, the ability to determine the correct decimal point location in the answer is critical. As mathematical problems become more complex, the knowledge and skills required to perform simple operations with decimals become essential tools for solving everyday problems.

While reviewing the training module, be sure to pay close attention to the videos and note the steps for each calculation. Follow along in the textbook to learn the process for inputting values and making calculations. Practice the examples shown in the videos and the text prior to attempting each quiz for better retention and to build your confidence. And remember that you may attempt the lesson quiz as many times as you like!

Pro Tips:

1. You should never round any intermediate steps of any math problem. The final answers must be carried out to all places unless directions are given to round to a specific number of decimal places.
2. As with previous lessons, it is critical that you gain skill in handling the word problems. Most exams are designed not only to test your knowledge of completing computations accurately, but also to identify if you can read a word problem and then decide what to do. This combines more than one skill into a math problem. Review the Pro Tip in Lesson 2 for insights into handling the word problems.
3. In the quiz for this lesson, all answers must be formulated as decimals – you will not be able to input answers as fractions for this lesson. For any decimals less than one, you may input the answer with a leading 0 before the decimal point (i.e. 0.75, 0.0125, etc.) or without a leading zero (.75, .0125, etc.).

Learning Objectives

After completing this lesson, you will be able to:

1. Convert numbers with fractions into decimal numbers.
2. Demonstrate skills in performing addition, subtraction, multiplication, and division of decimal numbers.
3. Determine the correct location of the decimal point when multiplying and dividing decimals.
4. Interpret and solve word problems that involve decimal numbers.

LESSON 4: Integers

Integers are the counting numbers 1, 2, 3, 4, 5 ... and their opposites, together with zero; positive numbers, negative numbers, and zero. Whether you know it or not, you have been constantly exposed to the concept of positive and negative numbers: the outside temperature goes above and below zero; a negative checkbook balance grabs your (or your bank's) attention, or the car battery needs to be charged.

You will continue to encounter numbers and fractions preceded by a +, denoting positive numbers, or a -, indicating negative numbers. It is very important to understand what these numbers represent and how to work with them. AC sine waves, rotating vectors, and scientific notation all involve the principles of positive and negative numbers.

In dealing with integers, there are two parts to the number: the numerical part, which indicates magnitude and is measured by the absolute value, and the sign part, which indicates direction from the origin (up or down, left or right). Identifying these parts and applying the rules of operations called for will ensure the correct answer.

While reviewing the training module, be sure to pay close attention to the videos and note the steps for each calculation. Follow along in the textbook to learn the process for inputting values and making calculations. Practice the examples shown in the videos and the text prior to attempting each quiz for better retention and to build your confidence. And remember that you may attempt the lesson quiz as many times as you like!

Pro Tip:

Some questions in the lesson activity quiz will require you to input answers in a specific way to be found correct. Be sure to pay attention to the examples listed in the question text. You will find this right away in Questions 1 and 2, where you will be inputting integers in an order.

Example Question: *Order 3, -8, 5 and 0 from least to greatest. Input the values separated by a comma and space. (Example: #, #, #, #)*

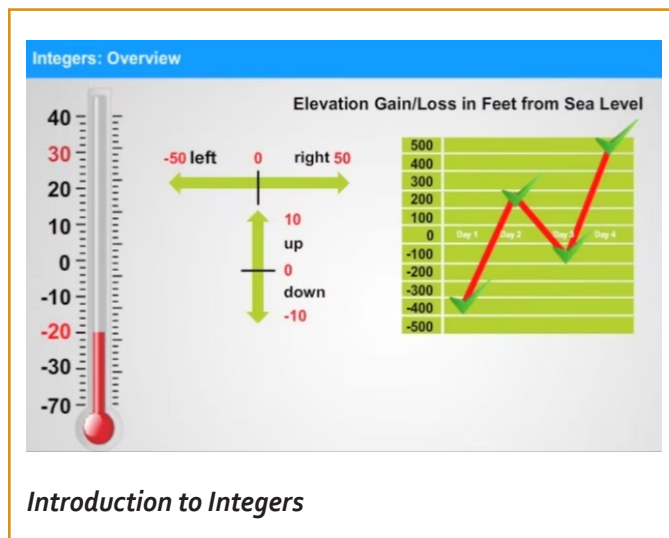
To get the question correct you would input the answer as follows: -8, 0, 3, 5

It can't be overstated: Making sure you are successful on the word problems is key to your success on this course. Keep using your notebook and/or scratch paper to extract the important information from the questions. See the Lesson 2 Pro Tip if the process seems foreign at this point.

Learning Objectives

After completing this lesson, you will be able to:

1. Understand the basic concepts of positive and negative numbers.
2. Demonstrate the ability to perform mathematical operations with integers.
3. Further develop skills in interpreting and solving word problems involving integers.



LESSON 5: Rational Numbers

Rational numbers are all the numbers that can be expressed as the ratio of two integers. Rational numbers include fractions, decimals, and integers, and, therefore, can be positive, negative, or zero. All of the types of numbers previously reviewed and the operations using rational numbers will use the same rules that are applied to fractions, decimals, and integers.

You should never round any intermediate steps of any math problem. The final answers must be carried out to all places unless directions are given to round to a specific number of decimal places. Also, all fractions should be reduced to their lowest terms.

Rational Numbers: Overview

→ rational numbers

represent points between integers

rules for rational numbers = rules for integers + rules for fractions and decimals

voltage

nearest tenth of a volt

- Adding Rational Numbers
- Subtracting Rational Numbers
- Multiplying Rational Numbers
- Dividing Rational Numbers

Introduction to Rational Numbers

While reviewing the training module, be sure to pay close attention to the videos and note the steps for each calculation. Follow along in the textbook to learn the process for inputting values and making calculations. Practice the examples shown in the videos and the text prior to attempting each quiz for better retention and to build your confidence. And remember that you may attempt the lesson quiz as many times as you like!

Pro Tips:

1. It can be slightly tricky to input improper fractions as your answers to the questions found in the lesson activity quiz. Be sure to review the video found in Lesson 1 if you are having any issues inputting your answers.
2. It is common for people to struggle with the word problems in the lesson activity quiz, especially Question 12. For this question, whether to understand the question or to verify you are on the right path, a best practice is to draw out the problem as a picture. Extract the needed information from the text of the question and see if you can draw a picture of the scenario.

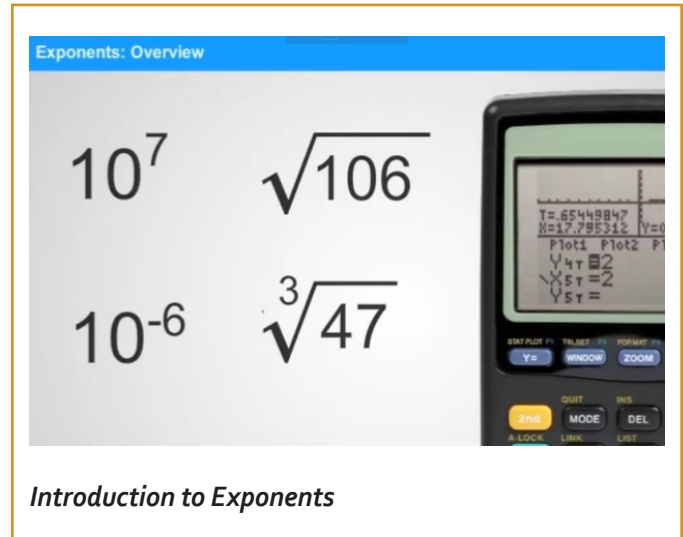
Learning Objectives

After completing this lesson, you will be able to:

1. Understand the basic operations of addition, subtraction, multiplication, and division of rational numbers.
2. Develop additional skills in solving word problems involving rational numbers.

LESSON 6: Exponents

The Electrical Worker is expected to work with equations in solving many types of problems. The variables in these equations are not always expressed as integers, decimals, or fractions, but may be expressed by using scientific notation or engineering notation using exponents to represent very large or very small quantities. These notations use powers of 10 or exponents of the number 10. It is much easier to solve a problem expressed as $(2.2 \times 10^7) \times (3.0 \times 10^{-6})$, rather than $22,000,000 \times 0.000003$. Some electronic measurement meters are designed to be used only with engineering notation. Therefore, it is important that you understand these notations and are comfortable using exponents.



Remember: Each notation is defined by the way the multiplier is identified.

- A number written in scientific notation is the product of a number between 1 and 10, and some power of 10. For example: (2.2×10^7) is correct for scientific notation, whereas (0.22×10^8) would be incorrect, even though it conveys the same value. The key to remember is that scientific notation is defined by the single unit (1 to 9) to the left of the decimal.
- A number written in engineering notation, the product of a number between 1 and 1,000, and the exponent in the power of 10 must be divisible by 3. For example: (3.0×10^{-6}) is correct for engineering notation where $(3,000 \times 10^{-9})$ would be incorrect, even though they both convey the same value. The key to remember is that engineering notation is defined by the single unit (1 to 999) to the left of the decimal.

The exponent used with the power of 10 in both notation forms indicates how many places to move the decimal point and in which direction. Finding the root of a number is the inverse of raising a number to a power. Many types of problems encountered in electrical work require calculating the square roots of numbers representing different electrical values. As with exponents, it is important to understand thoroughly the principles involved.

While reviewing the training module, be sure to pay close attention to the videos and note the steps for each calculation. Follow along in the textbook to learn the process for inputting values and making calculations. Practice the examples shown in the videos and the text prior to attempting each quiz for better retention and to build your confidence. And remember that you may attempt the lesson quiz as many times as you like!

Pro Tip:

It is important to input your answers to the quiz questions accurately for them to be evaluated correctly. If you do type the answers and need to use an operator like the multiplication sign, be sure to use the asterisk (Shift-8 on most keyboards) character if you are using your computer keyboard. The letter “x” will not be recognized as a mathematical operator.

It may be very useful in this lesson to input answers by using the MathType feature and either drawing in your answer with your mouse or finger, as appropriate for your device.

Be sure to see that your answer is displayed on the screen before moving on to subsequent questions. Answers inputted that are displayed are saved.

Learning Objectives

After completing this lesson, you will be able to:

1. Convert between rational numbers and numbers written in scientific or engineering notation.
2. Develop skills in solving problems with values expressed in scientific or engineering notation and using the laws of exponents.
3. Calculate square roots and recognize numbers that are perfect squares.

LESSON 7: Units and Measurements

Units are simply standards by which we can measure. They allow us to identify objects and quantities in a way that permits standardized measurement. There are different measuring systems, such as the customary system used in the United States and the metric system, and there are many different units within each system available to identify the same quantity. Therefore, it is essential that you understand how to convert a given measurement from one unit to another and from one system to another. Remember, the key to converting units is to establish the correct conversion factor. It also helps to be aware of changing to a larger or smaller unit. Properly setting up a conversion problem will greatly reduce the chance of error.



You will frequently find that working with measurements is based on the prefixes used in the metric system. Some examples include measurements of power (kilowatts), voltage (millivolts), and frequency (megahertz). The standard prefixes and symbols used most often in electrical applications are:

PREFIX	SYMBOL	MULTIPLIER
Giga	G	1,000,000,000 or 10^9
Mega	M	1,000,000 or 10^6
Kilo	k	1,000 or 10^3
Milli	m	0.001 or 10^{-3}
Micro	μ	0.000001 or 10^{-6}
Nano	n	0.000000001 or 10^{-9}
Pico	p	0.000000000001 or 10^{-12}

While reviewing the training module, be sure to pay close attention to the videos and note the steps for each calculation. Follow along in the textbook to learn the process for inputting values and making calculations. Practice the examples shown in the videos and the text prior to attempting each quiz for better retention and to build your confidence. And remember that you may attempt the lesson quiz as many times as you like!

Pro Tip:

Be sure to read the entire question stem for each question. On many of the lesson activity quiz questions, there is a rounding statement. It's important to note that the required rounding may be different on each question. As always, even in math, your reading comprehension skills are vital to your success.

Learning Objectives

After completing this lesson, you will be able to:

1. Identify what various units of measure represent.
2. Determine appropriate conversion factors.
3. Demonstrate the ability to convert between different units of measurement.

LESSON 8: Algebra Essentials

Many of the problems you will confront as an electrical apprentice and a Journey-level Electrical Worker include expressions with unknown quantities or variables. The ability to work with and evaluate such expressions is critical to achieving success in the electrical industry. In this introduction to algebra, the basic operations and properties involved with algebraic expressions form the foundation for solving equations with unknowns.

While reviewing the training module, be sure to pay close attention to the videos and note the steps for each calculation. Follow along in the textbook to learn the process for inputting values and making calculations. Practice the examples shown in the videos and the text prior to attempting each quiz for better retention and to build your confidence. And remember that you may attempt the lesson quiz as many times as you like!



Algebra is the study of operations and relationships among numbers.

And remember that you may attempt the lesson quiz as many times as you like!

Pro Tip:

In the lesson activity, you will be asked to simplify expressions. In this type of operation, it is common to not actually identify a single numerical answer, but instead input a full expression as the result of your simplification.

Example question: *Simplify the following expression:*

$$3(x + 5) + 2x - 18$$

You may identify as many as four or more steps to complete the simplification of this expression, but the final answer will be submitted as:

$$5x - 3$$

It is also acceptable to input this answer as:

$$-3 + 5x$$

Or even:

$$5x-3$$

The system allows for changing locations of the values as well as the adjustment of spacing.

Learning Objectives

After completing this lesson, you will be able to:

1. Develop the understanding of the order of operations used in algebraic expressions.
2. Develop the skills in applying the algebraic properties of addition and multiplication.
3. Demonstrate the skills needed to simplify algebraic expressions.

LESSON 9: Equations, Formulas, and Inequalities

You will often deal with the relations between different quantities. These relationships can be expressed as an algebraic equation where two expressions are equal or as an inequality where the two expressions are not equal. One type of equation is a formula that typically has more than one variable, such as

$$dB = 10 \log \frac{P_1}{P_2}$$

for calculating the gain in decibels. In many cases, you will have to figure out the unknown quantity.

The basic algebraic equation is prevalent throughout the industry. It is virtually impossible to succeed without fundamental skills in algebra. In the last lesson, the basics of working with algebraic expressions were introduced. In this lesson, those concepts will be put to work in solving an equation for an unknown variable.

It is key to achieving success in the industry to be able to take a real-world problem and set it up as an equation to find the unknown quantity. Often, the trick is to set the variable to the unknown quantity and then to write a statement in the form of an equation that describes the situation as given.

While reviewing the training module, be sure to pay close attention to the videos and note the steps for each calculation. Follow along in the textbook to learn the process for inputting values and making calculations. Practice the examples shown in the videos and the text prior to attempting each quiz for better retention and to build your confidence. And remember that you may attempt the lesson quiz as many times as you like!

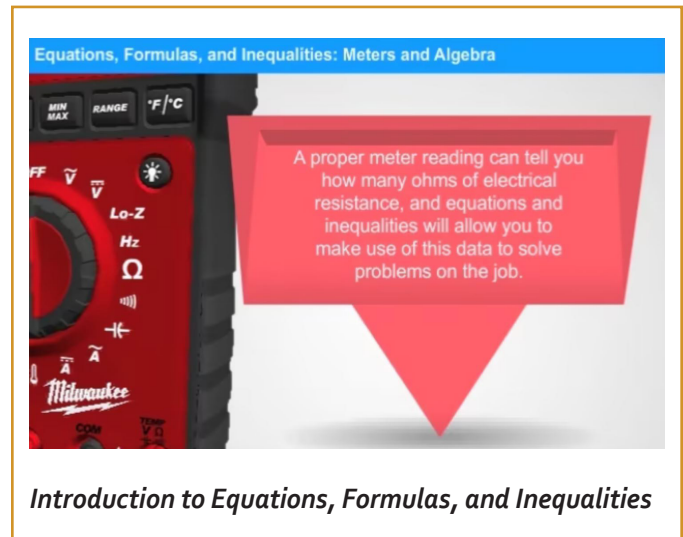
Pro Tip:

It will be important to write out expressions in your notebook based on the information given in the word problems on Questions 18 to 25 to best help you write appropriate expressions and then solve for the missing variables.

Learning Objectives

After completing this lesson, you will be able to:

1. Express relationships in algebraic form.
2. Translate words into equations and set up problems involving equations.
3. Demonstrate the skills for solving problems expressed in algebraic form.



LESSON 10: Ratios, Rates, and Proportions

Many relationships encountered in electrical systems are expressed as ratios or proportions. A ratio is simply a comparison, usually done by division of two quantities in the same units of measurement.

In the electrical industry, some variables can be expressed much more easily when shown as ratios. Some examples of ratios include the relationship between the primary and secondary windings of transformers and the relationship between pulleys or gears on motors and the loads they drive.

A proportion is an equation that states two ratios are equal. A proportion illustrates that two quantities depend on each other. This dependence equates to either a direct or an inverse, or indirect, relationship.

Some relationships, such as a comparison of input and output voltages for a transformer as a function of the primary and secondary windings of the transformer, are better expressed as a proportion.

The previous lesson explored how to set up and solve equations; in this lesson, those skills will be used to solve problems involving ratios and proportions.

While reviewing the training module, be sure to pay close attention to the videos and note the steps for each calculation. Follow along in the textbook to learn the process for inputting values and making calculations. Practice the examples shown in the videos and the text prior to attempting each quiz for better retention and to build your confidence. And remember that you may attempt the lesson quiz as many times as you like!

Pro Tip:

Ratios may be expressed as a fraction, as a decimal, or in the format #:#. The questions in the lesson activity quiz will provide specifics about how to answer. It will be important to pay attention to the question to identify how you should input your answer.

As always, use your notebook to help you work out problems. People who struggle with word problems tend to try to do too much in their head and not enough out on the page.

Learning Objectives

After completing this lesson, you will be able to:


1. Demonstrate the skills needed to set up and solve problems involving ratios.
2. Understand the use of proportions to show the relationship between two ratios.
3. Set up and solve problems using direct and inverse proportions.

Ratios, Rates, and Proportions: Overview


ratio and proportion

The ratio of strawberries to blueberries is **1 to 4**.


electricians



Resistance



Wire sizes



➔ Identify and Solve Proportions
➔ Solve Direct Proportion Problems

Introduction to Ratios, Rates, and Proportions

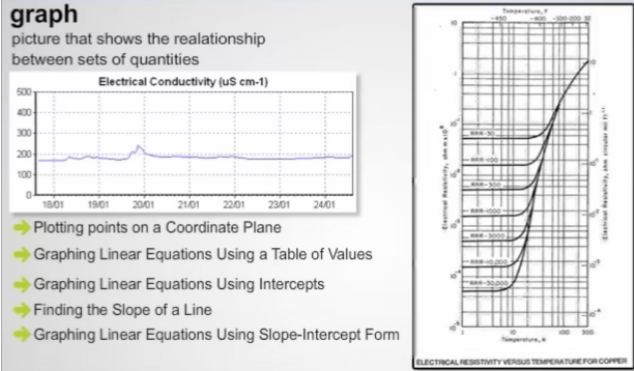
LESSON 11: The Cartesian Plane

In many instances in electrical work, a pictorial representation of a situation can provide a lot of information on how variables relate to each other. The Cartesian plane is one such method that allows you to draw a picture of a given scenario. This coordinate plane, formed by two number lines intersecting at right angles, describes the properties and relationships of points and lines.

Your ability to understand and work with the coordinate plane and linear equations is very important and provides the foundation for geometry and vectors in later lessons.

The Cartesian Plane: Overview

graph
picture that shows the relationship between sets of quantities



- ▶ Plotting points on a Coordinate Plane
- ▶ Graphing Linear Equations Using a Table of Values
- ▶ Graphing Linear Equations Using Intercepts
- ▶ Finding the Slope of a Line
- ▶ Graphing Linear Equations Using Slope-Intercept Form

Introduction to The Cartesian Plane

While reviewing the training module, be sure to pay close attention to the videos and note the steps for each calculation. Follow along in the textbook to learn the process for inputting values and making calculations. Practice the examples shown in the videos and the text prior to attempting each quiz for better retention and to build your confidence. And remember that you may attempt the lesson quiz as many times as you like!

Pro Tip:

As is often the case with any quiz you may take, at times even a math quiz can be a reading quiz at the same time. Be sure to pay attention to how your answer must be inputted. For example, where coordinates are needed as a solution to a question, you will need to input the answer with two parentheses and a comma like this (*with the # symbol representing a number*): (#,#).

The key to your success on this quiz beyond understanding how to work with the Cartesian plane and the evaluating of slope and slope-intercept will be you paying attention to how to input your answers by reading all of each question stem.

Learning Objectives

After completing this lesson, you will be able to:

1. Plot points and lines on a coordinate plane and convert to or from percentages.
2. Write and graph linear equations.
3. Identify the slope of a line.

LESSON 12: Systems of Equations

As previously stated, the use of algebraic expressions in the electrical industry is prolific. By combining your knowledge of algebraic expressions and linear equations, you can solve a system of equations, comprised of two or more linear equations with two or more unknown variables. The key to solving such systems of equations is to isolate and determine only one variable at a time.

While reviewing the training module, be sure to pay close attention to the videos and note the steps for each calculation. Follow along in the textbook to learn the process for inputting values and making calculations. Practice the examples shown in the videos and the text prior to attempting each quiz for better retention and to build your confidence. And remember that you may attempt the lesson quiz as many times as you like!

While reviewing the training module, be sure to pay close attention to the videos and note the steps for each calculation. Follow along in the textbook to learn the process for inputting values and making calculations. Practice the examples shown in the videos and the text prior to attempting each quiz for better retention and to build your confidence. And remember that you may attempt the lesson quiz as many times as you like!

Congratulations for reaching this final lesson of training in the Tech Math course. By reaching this point in the course, you have likely developed great skills at practicing and improving your math skills. Do not let up now.

Pro Tip:

There are a handful of ways one can go about solving the problems in this lesson. Be sure to review the training videos and the textbook for insights on how to handle systems of equations. Sometimes you can save yourself a load of effort by choosing the best method for the situation.

Learning Objectives

After completing this lesson, you will be able to:

1. Apply the skills needed to solve algebraic equations.
2. Use the skills needed to solve systems of equations.
3. Further demonstrate the abilities to set up and solve word problems involving multiple equations.

Systems of Equations: Overview

➔

more than one relationship between two variables
two equations to describe each relationship

x	y = x - 2	x	y = x - 2	(x,y)
-2		-2	-2 - 2 = -4	(-2, -4)
-1		-1	-1 - 2 = -3	(-1, -3)
0		0	0 - 2 = -2	(0, -2)
1		1	1 - 2 = -1	(1, -1)
2		2	2 - 2 = 0	(2, 0)

Introduction to Systems of Equations

LESSON 13: Tech Math Final Exam

Congratulations for making it to this point in the training. On this final activity, you will be tested on each learning objective covered in this course. The exam consists of 40 questions and has a time limit of two hours 30 minutes. When opening the exam, please note the timer will start and keep running, even if you leave the exam. If you are still testing when the timer runs out, the exam will be automatically submitted and scored.

Before you begin the exam, here are a few tips for taking this (or any) exam:

- Be sure you have studied properly.
 - Take time to adequately review all lesson training material found in the previous lessons before beginning.
- Be sure to begin exams only after getting good rest.
- Read instructions carefully, both exam and individual question instructions.
- Address each question individually.
 - Changing answers is a risky proposition. In general, only change an answer when you can clearly see that you either misread, misunderstood, or made a mistake on the question.
 - If you don't understand the question, don't select an equally unfamiliar answer. If you have never heard of the word or simply don't understand an answer option, it is very unlikely that it is the correct answer.
- While being aware of the time available, pace yourself and be sure to relax.



Final Notes:

- **You will have 2-hours 30-minutes to complete this 40-question exam, and the timer starts as soon as you begin. If you pause or leave, the time will continue to tick down. Be sure you have allotted yourself the time to complete this exam.**
- **You will not be able to review your attempt following the grading of this exam. Only a final score will be displayed.**
- **You may only attempt this exam up to 2 times to receive a passing grade of 75%.**
- **Failure to achieve the minimum score after two attempts will require requesting a retake of the course from your administrator.**

Review the learning objectives below one last time and think about your knowledge of them. This is a comprehensive list of learning objectives for the entire course.

When you are ready, access the lesson activity and begin.

Good luck!

Learning Objectives

After completing this lesson, you will be able to:

1. Demonstrate skill in the basic operations of addition, subtraction, multiplication, and division of whole numbers, including regrouping.
2. Develop skills in interpreting and solving word problems using whole numbers.
3. Demonstrate skill in working with proper fractions, improper fractions, and mixed numbers to achieve the correct form required to solve specific problems.
4. Demonstrate the ability to add, subtract, multiply, and divide numbers with fractions.
5. Develop skills in solving word problems involving fractions.
6. Develop skills in reducing fractions to their simplest form.
7. Convert numbers with fractions into decimal numbers.
8. Demonstrate skills in performing addition, subtraction, multiplication, and division of decimal numbers.
9. Determine the correct location of the decimal point when multiplying and dividing decimals.
10. Interpret and solve word problems that involve decimal numbers.
11. Understand the basic concepts of positive and negative numbers.
12. Demonstrate the ability to perform mathematical operations with integers.
13. Further develop skills in interpreting and solving word problems involving integers.
14. Understand the basic operations of addition, subtraction, multiplication, and division of rational numbers.
15. Develop additional skills in solving word problems involving rational numbers.
16. Convert between rational numbers and numbers written in scientific or engineering notation.
17. Develop skills in solving problems with values expressed in scientific or engineering notation and using the laws of exponents.
18. Calculate square roots and recognize numbers that are perfect squares.
19. Identify what various units of measure represent.
20. Determine appropriate conversion factors.
21. Demonstrate the ability to convert between different units of measurement.
22. Develop the understanding of the order of operations used in algebraic expressions.
23. Develop the skills in applying the algebraic properties of addition and multiplication.
24. Demonstrate the skills needed to simplify algebraic expressions.
25. Express relationships in algebraic form.
26. Translate words into equations and set up problems involving equations.
27. Demonstrate the skills for solving problems expressed in algebraic form.
28. Demonstrate the skills needed to set up and solve problems involving ratios.
29. Understand the use of proportions to show the relationship between two ratios.
30. Set up and solve problems using direct and inverse proportions.
31. Plot points and lines on a coordinate plane and to convert to or from percentages.
32. Write and graph linear equations.
33. Identify the slope of a line.
34. Apply the skills needed to solve algebraic equations.
35. Use the skills needed to solve systems of equations.
36. Further demonstrate the abilities to set up and solve word problems involving multiple equations.