



How to support your student as they learn about Introduction to Quadratic Functions

Mathematics is a connected set of ideas, and your student knows a lot. Encourage them to use the mathematics they already know when encountering new concepts in this topic.

Where are we?



In this MATHbook topic, students examine scenarios that they can represent with quadratic functions with an equation, a graph, and a table of values and explore the characteristics of the functions represented by each situation and different forms of a quadratic function. They transform quadratic functions and summarize the attributes of different forms of quadratic functions.

Where have we been? ←

Students have had a brief introduction to a few scenarios modeled using quadratic functions. In a previous topic, students created a graphic organizer that highlighted the form of a quadratic function, a few sample graphs, and the key characteristics that can define a quadratic function.

Where are we going? →

In this topic, students will solidify their knowledge of function transformations. Understanding how to sketch a quadratic is the underpinning for sketching more complicated polynomials in higher levels of mathematics.



MATHia

Encourage your students to work through the sequence of MATHia assigned to them. These workspaces deepen their understanding and provide practice with the concepts of **Introduction to Quadratic Functions**.

Exploring Quadratic Functions

- Introduction to a Quadratic Function
- Modeling Area as Product of Monomial and Binomial
- Modeling Area as Product of Two Binomials
- Modeling Projectile Motion
- Recognizing Key Features of Vertical Motion Graphs
- Interpreting Maximums of Quadratic Models

Key Characteristics of Quadratic Functions

- Recognizing Quadratic Functions from Tables
- Identifying Properties of Quadratic Function

Transformations of Quadratic Functions

- Vertically Translating Quadratic Functions
- Horizontally Translating Quadratic Functions
- Reflecting and Dilating Quadratic Functions Using Graphs
- Transforming Quadratic Functions Using Tables
- Multiple Transformations of Quadratic Functions

Sketching and Comparing Quadratic Functions

- Comparing Increasing Linear, Exponential, and Quadratic Functions
- Sketching Quadratic Functions
- Comparing Quadratic Functions in Different Forms



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MARK YOUR CALENDAR
End of Topic Test:



How to support your student as they learn

MATH MYTH

If I can get the right answer, then I should not have to explain why.

Sometimes you get the right answer for the wrong reasons. Suppose a teacher asks a student, “What is 4 divided by 2?” The student subtracts 2 from 4 and answers, “2!”. She gave the right answer but had an incomplete understanding of division.

However, suppose the teacher asks her to explain her reasoning by drawing a picture, creating a model, or giving a different example. In that case, the teacher has a chance to uncover her flawed understanding.

If teachers don’t know their students’ reasoning for both right and wrong answers, then they cannot address misconceptions. This is important because new math learning builds upon previous understandings.

Ask your student to explain his or her thinking, when possible, even when you don’t know the correct answer. When children (and adults) explain something to someone else, the very process helps them learn.

#mathmythbusted

Talking Points

Discuss With Your Student

Your student is learning about quadratic functions. You can further support your student’s learning by asking questions about the work they do in class or at home.

Questions to Ask

- 1 *How does this problem look like something you did in class?*
- 2 *Can you show me the strategy you used to solve this problem? Do you know another way to solve it?*
- 3 *Does your answer make sense? How do you know?*
- 4 *Is there anything you don’t understand? How can you use today’s lesson to help?*

**KEY TERMS****roots**

The roots of an equation indicate where the graph of the equation crosses the x-axis.

vertex form

A quadratic function written in the form $f(x) = a(x - h)^2 + k$, where $a \neq 0$, is in vertex form.

general form

A quadratic function written in the form $f(x) = ax^2 + bx + c$, where $a \neq 0$, is in general form, or standard form.

factored form

A quadratic function written in the form $f(x) = a(x_1 - r)(x_2 - r)$, where $a \neq 0$, is in factored form.



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MARK YOUR CALENDAR
End of Topic Test:



How to support your student as they learn about Solving Quadratic Equations

Mathematics is a connected set of ideas, and your student knows a lot. Encourage them to use the mathematics they already know when encountering new concepts in this topic.

Where are we?



In this MATHbook topic, students review polynomials. They use different methods to add, subtract, and multiply polynomials. Students use what they know about square roots and graphs of quadratic equations to solve equations of the form $x^2 = n$ and $ax^2 - c = n$. Students then learn to factor or complete the square to solve quadratic equations. Finally, students derive the Quadratic Formula.

Where have we been? ←

Students have explored zeros of functions and have interpreted their meaning in contextual situations. Students know that the factored form of a quadratic equation gives the zeros of the function.

Where are we going? →

Understanding the structure and symmetry of a quadratic equation allows students to solve quadratics with complex roots as well as higher-order polynomials in Algebra 2 and beyond.



MATHia

Encourage your students to work through the sequence of MATHia assigned to them. These workspaces deepen their understanding and provide practice with the concepts of **Solving Quadratic Equations**.

Adding, Subtracting, and Multiplying Polynomials

- Introduction to Polynomial Arithmetic
- Identifying Parts of Complex Algebraic Expressions
- Operating with Functions on the Coordinate Plane
- Operating with Polynomials

Representing Solutions to Quadratic Equations

- Making Sense of Roots and Zeros
- Factoring using Difference of Squares

Solutions to Quadratic Equations in Vertex Form

- Using Properties of Equality to Solve Quadratic Equations

Factoring and Completing the Square

- Introduction to Factoring
- Factoring Trinomials with Coefficients of One and Coefficients Other than One
- Factoring Quadratic Expressions
- Solving Quadratic Equations by Factoring
- Problem Solving Using Factoring
- Completing the Square
- Problem Solving Using Completing the Square

The Quadratic Formula

- Deriving the Quadratic Formula
- Solving Quadratic Equations



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MARK YOUR CALENDAR
End of Topic Test:



How to support your student as they learn

MATH MYTH

I learn best when the instruction matches my learning style.

If asked, many people will tell you they have a learning style—the expressed preference in learning by seeing images, hearing speech, seeing words, or being able to physically interact with the material. Some people even believe that it is the teacher’s job to present the information in accordance with that preference.

However, it turns out that the best scientific evidence available does not support learning styles. In other words, when an auditory learner receives instruction about content through a visual model, they do just as well as auditory learners who receive spoken information. Students may have a preference for visuals or writing or sound, but sticking to their preference doesn’t help them learn any better. Far more important is ensuring the student is engaged in an interactive learning activity and the new information connects to the student’s prior knowledge.

#mathmythbusted

Talking Points

Discuss With Your Student

Your student is learning about solving quadratic equations. You can further support your student’s learning by asking questions about the work they do in class or at home.

Questions to Ask

- 1 *How does this problem look like something you did in class?*
- 2 *Can you show me the strategy you used to solve this problem? Do you know another way to solve it?*
- 3 *Does your answer make sense? How do you know?*
- 4 *Is there anything you don’t understand? How can you use today’s lesson to help?*

**KEY TERMS****polynomial**

A polynomial is a mathematical expression involving the sum of powers in one or more variables multiplied by coefficients.

degree of a polynomial

The greatest exponent in a polynomial determines the degree of the polynomial.

difference of two squares

The difference of two squares is an expression in the form $a^2 - b^2$ that has factors $(a + b)$ and $(a - b)$.



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MARK YOUR CALENDAR
End of Topic Test:



How to support your student as they learn about Characteristics of Polynomial Functions

Mathematics is a connected set of ideas, and your student knows a lot. Encourage them to use the mathematics they already know when encountering new concepts in this topic.

Where are we?



In this MATHbook topic, students start with a study of power functions of the form $P(x) = ax^n$. Students are then introduced to polynomial functions and their transformations. They build cubic and quartic functions both graphically and algebraically and then close the topic by analyzing polynomial functions and applying polynomial functions to a variety of real-world situations.

Where have we been? ←

Students have extensive experience analyzing nonlinear functions, identifying their key characteristics, and graphing their transformations. Students have manipulated and solved basic polynomial equations.

Where are we going? →

Students will work with polynomial functions and equations closely in the next two topics. Polynomial functions are used throughout the sciences and in engineering to model complex real-world situations and data sets.



Encourage your students to work through the sequence of MATHia assigned to them. These workspaces deepen their understanding and provide practice with the concepts of **Characteristics of Polynomial Functions**.

Power Functions

- Analyzing Polynomial Functions
- Classifying Polynomial Functions

Key Characteristics of Polynomial Functions

- Identifying Key Characteristics of Polynomial Functions
- Identifying Zeros of Polynomials
- Using Zeros to Sketch Graphs of Polynomials

Analyzing and Comparing Polynomial Functions

- Interpreting Key Features of Graphs in Terms of Quantities
- Understanding Average Rate of Change of Polynomial Functions
- Comparing Polynomial Functions in Different Forms



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MARK YOUR CALENDAR
End of Topic Test:



How to support your student as they learn

MATH MYTH

**Students only use
10% of their brains.**

Hollywood is in love with the idea that humans only use a small portion of their brains. This notion formed the basis of the movies *Lucy* (2014) and *Limitless* (2011). Both films ask the audience: Imagine what you could accomplish if you could use 100% of your brain!

Well, this isn't Hollywood, and you're stuck with an ordinary brain. The good news is that you do use 100% of your brain. As you look around the room, your *visual cortex* is busy assembling images; your *motor cortex* is busy moving your neck; and all of the associative areas recognize the objects that you see. Meanwhile, the *corpus callosum*, which is a thick band of neurons that connect the two hemispheres, ensures that all of this information is kept coordinated. Moreover, the brain does this automatically, which frees up space to ponder deep, abstract concepts like mathematics!

#mathmythbusted

Talking Points

Discuss With Your Student

Your student is learning about polynomial functions. You can further support your student's learning by asking questions about the work they do in class or at home.

Questions to Ask

- 1 How does this problem look like something you did in class?
- 2 Can you show me the strategy you used to solve this problem? Do you know another way to solve it?
- 3 Does your answer make sense? How do you know?
- 4 Is there anything you don't understand? How can you use today's lesson to help?



KEY TERMS

even function

An even function has a graph symmetric about the y -axis, thus $f(x) = f(-x)$.

odd function

An odd function has a graph symmetric about the origin, thus $f(x) = -f(-x)$.

polynomial function

A polynomial function is a function in the form $[]x^n + []x^{n-1} + \dots + []x^2 + []x + []$. In a polynomial function, the coefficients, represented by each $[]$, are complex numbers and the exponents are nonnegative integers.

average rate of change

The average rate of change of a function is the ratio of the change in the dependent variable to the change in the independent variable over a specific interval.



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MARK YOUR CALENDAR
End of Topic Test:



How to support your student as they learn about **Relating Factors and Zeros**

Mathematics is a connected set of ideas, and your student knows a lot. Encourage them to use the mathematics they already know when encountering new concepts in this topic.

Where are we?



In this MATHbook topic, the Factor Theorem is introduced and used to determine whether a linear expression is a factor of a polynomial function. Methods of factoring polynomials are introduced, and students solve polynomial inequalities both graphically and algebraically, given mathematical and real-world situations. Finally, students investigate the Closure Property for polynomials.

Where have we been? ←

Students have factored expressions since elementary school. They have factored degree-2 polynomial equations in order to isolate key characteristics of the functions represented by those equations.

Where are we going? →

Polynomial equations are used in industry to track financial and inventory information, and in data science to build predictive models and to help analyze and answer research questions. Students will use what they learned in this topic to help them build real-world polynomial models in the next topic.



MATHia

Encourage your students to work through the sequence of MATHia assigned to them. These workspaces deepen their understanding and provide practice with the concepts of **Relating Factors and Zeros**.

Polynomial Multiplication and Division

- Using a Factor Table to Multiply Polynomials
- Multiplying Polynomials
- Synthetic Division
- Factoring Higher-Order Polynomials
- Solving Polynomial Functions

Solving Polynomial Inequalities

- Solving Polynomial Inequalities



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MARK YOUR CALENDAR
End of Topic Test:



How to support your student as they learn

MATH MYTH

Just watch a video, and you will understand it.

Has this ever happened to you? Someone explains something, and it all makes sense at the time. You feel like you get it. But then, a day later when you try to do it on your own, you suddenly feel like something's missing? If that feeling is familiar, don't worry. It happens to us all. It's called the illusion of explanatory depth, and it frequently happens after watching a video.

How do you break this illusion? The first step is to try to make the video interactive. Don't treat it like a TV show. Instead, pause the video and try to explain it to yourself or to a friend. Alternatively, attempt the steps in the video on your own and rewatch it if you hit a wall. Remember, it's easy to confuse familiarity with understanding.

#mathmythbusted

Talking Points

Discuss With Your Student

Your student is learning about factoring higher-order functions. You can further support your student's learning by asking questions about the work they do in class or at home.

Questions to Ask

- 1 *How does this problem look like something you did in class?*
- 2 *Can you show me the strategy you used to solve this problem? Do you know another way to solve it?*
- 3 *Does your answer make sense? How do you know?*
- 4 *Is there anything you don't understand? How can you use today's lesson to help?*

**KEY TERMS**

Factor Theorem

The Factor Theorem states that a polynomial function $p(x)$ has $(x - r)$ as a factor if and only if the value of the function at r is 0, or $p(r) = 0$.

Remainder Theorem

The Remainder Theorem states that when any polynomial equation or function, $f(x)$, is divided by a linear expression of the form $(x - r)$, the remainder is $R = f(r)$, or the value of the equation or function when $x = r$.

closed under an operation

When an operation is performed on any number or expression in a set and the result is in the same set, it is said to be closed under that operation.



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MARK YOUR CALENDAR
End of Topic Test:



How to support your student as they learn about Radical Functions

Mathematics is a connected set of ideas, and your student knows a lot. Encourage them to use the mathematics they already know when encountering new concepts in this topic.

Where are we?



In this MATHbook topic, students explore radical functions, rewrite radical expressions, and solve radical equations. Using patty paper, students switch the x - and y -axes of power functions and generate their inverses, recognizing that they are transposing the axes when they are inverting a function. With an understanding of radical functions, students then consider radical expressions and equations.

Where have we been? ←

Students have experience with reflecting functions across the line $y = x$ to determine an inverse graphically and transposing x and y in an equation to determine an inverse algebraically.

Where are we going? →

Students will explore the inverses of exponential functions, which introduces them to logarithmic functions. Radical functions are used extensively to model real-world problems, particularly in physics and in other applications, including medical dosage, wind speed, pendulums, and centrifugal force.



MATHia

Encourage your students to work through the sequence of MATHia assigned to them. These workspaces deepen their understanding and provide practice with the concepts of **Radical Functions**.

Inverses of Functions

- Investigating Inverses of Functions
- Sketching Graphs of Inverses
- Graphing Square Root Functions
- Calculating Inverses of Linear Functions

Rewriting Radical Expressions

- Rewriting Radicals
- Adding and Subtracting Radicals
- Multiplying Radicals
- Dividing Radicals
- Rewriting Radicals with Variables
- Adding and Subtracting Radicals with Variables



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MARK YOUR CALENDAR
End of Topic Test:



How to support your student as they learn

MATH MYTH

Faster = smarter.

In most cases, speed has nothing to do with how smart you are. Why is that? Because it largely depends on how familiar you are with a topic. For example, a bike mechanic can look at a bike for about 8 seconds and tell you details about the bike that you probably didn't even notice (e.g., the front tire is on backwards). Is that person smart? Sure! Suppose, instead, you show the same bike mechanic a car. Will they be able to recall the same amount of detail as for the bike? No!

It's easy to confuse speed with understanding. Speed is associated with the memorization of facts. Understanding, on the other hand, is a methodical, time-consuming process. Understanding is the result of asking lots of questions and seeing connections between different ideas. Many mathematicians who won the Fields Medal (i.e., the Nobel prize for mathematics) describe themselves as extremely slow thinkers. That's because mathematical thinking requires understanding over memorization.

#mathmythbusted

Talking Points

Discuss With Your Student

Your student is learning about radical functions. You can further support your student's learning by asking questions about the work they do in class or at home.

Questions to Ask

- 1 *How does this problem look like something you did in class?*

- 2 *Can you show me the strategy you used to solve this problem? Do you know another way to solve it?*

- 3 *Does your answer make sense? How do you know?*

- 4 *Is there anything you don't understand? How can you use today's lesson to help?*



KEY TERMS

inverse of a function

The inverse of a function is the set of all ordered pairs (y, x) , or $(f(x), x)$.

radical function

The inverses of power functions with exponents greater than or equal to 2, such as the square root function and the cube root function, are radical functions.

composition of functions

The process of evaluating one function inside another function is called the composition of functions. For two functions f and g , the composition of functions uses the output of $g(x)$ as the input of $f(x)$.



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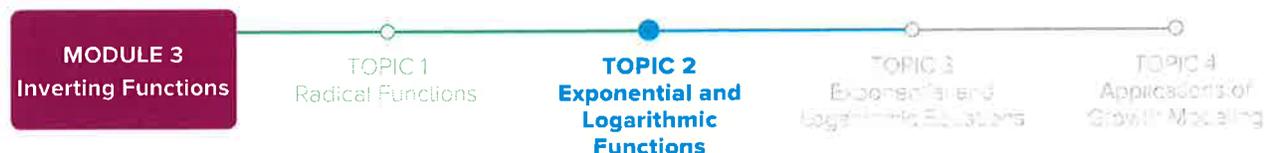
MARK YOUR CALENDAR
End of Topic Test:



How to support your student as they learn about Exponential and Logarithmic Functions

Mathematics is a connected set of ideas, and your student knows a lot. Encourage them to use the mathematics they already know when encountering new concepts in this topic.

Where are we?



In this MATHbook topic, students create exponential graphs using their prior knowledge of geometric sequences. They write exponential growth and decay functions given specified characteristics. Logarithmic functions are introduced as the inverse of exponential functions. Students explore the key characteristics of the logarithmic function and transformations of logarithmic functions.

Where have we been?

Students have analyzed exponential functions, including their key characteristics and transformations. They have also investigated inverse functions in the previous topic and in earlier courses.

Where are we going?

Students will analyze logarithmic equations and apply logarithmic functions to situations. As will be shown in the situations in these topics, logarithmic functions have a number of applications in astronomy, medicine, mechanics, physics, and seismology.



Encourage your students to work through the sequence of MATHia assigned to them. These workspaces deepen their understanding and provide practice with the concepts of **Exponential and Logarithmic Functions**.

Exponential and Logarithmic Functions

- Properties of Exponential Graphs
- Introduction to Logarithmic Functions



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MARK YOUR CALENDAR
End of Topic Test:



How to support your student as they learn

MATH MYTH

Some students are “right-brain” learners while other students are “left-brain” learners.

As you may know, the brain has left and right hemispheres. Some people assign dominant modes of thinking to the sides of the brain. They consider a more intuitive, creative, and imaginative person as “right-brained” and a more logical, verbal, and mathematical thinker as “left-brained.”

The brain is also composed of lobes. The occipital lobe, located in the back of the brain, is responsible for processing visual information. The temporal lobes, which sit above your ears, process language and sensory information. A band across the top of your head, the parietal lobe, controls movement. Finally, the frontal lobe is where planning and learning occurs. Another way to think about the brain is from the back to the front, where information goes from highly concrete to abstract.

The brain is a highly interconnected organ. We don't claim that some people are “back brain thinkers” while others are “frontal thinkers.” Each lobe hands off information to other lobes to process, and the lobes constantly interact. All of us are whole-brain thinkers!

#mathmythbusted

Talking Points

Discuss With Your Student

Your student is learning about exponential and logarithmic functions. You can further support your student's learning by asking questions about the work they do in class or at home.

Questions to Ask

- 1 *How does this problem look like something you did in class?*
- 2 *Can you show me the strategy you used to solve this problem? Do you know another way to solve it?*
- 3 *Does your answer make sense? How do you know?*
- 4 *Is there anything you don't understand? How can you use today's lesson to help?*



KEY TERMS

natural base e

The natural base e is a mathematical constant approximately equal to 2.71828.

logarithm

The logarithm of a number for a given base is the exponent to which you must raise the base in order to produce the number.

natural logarithm

A natural logarithm is a logarithm with base e , and is usually written as \ln .



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MARK YOUR CALENDAR
End of Topic Test:



How to support your student as they learn about **Exponential and Logarithmic Equations**

Mathematics is a connected set of ideas, and your student knows a lot. Encourage them to use the mathematics they already know when encountering new concepts in this topic.

Where are we?



In this MATHbook topic, students first convert between exponential and logarithmic forms of an equation, and then use this relationship to solve for an unknown base, exponent, or argument in a logarithmic equation. Students derive the Change of Base Formula and solve logarithmic equations for the base, argument, or exponent using the formula or by rewriting them as exponential equations.

Where have we been? ←

Students oriented their thinking around exponential and logarithmic functions in the previous topic. From their prior work, students have experience with manipulating equations of function inverses.

Where are we going? →

As evidenced by the scenarios in this topic, logarithmic equations are used to represent a large variety of complex real-world situations.



MATHia

Encourage your students to work through the sequence of MATHia assigned to them. These workspaces deepen their understanding and provide practice with the concepts of **Exponential and Logarithmic Equations**.

Solving Logarithmic Equations

- Solving Base 2 and Base 10 Equations
- Solving Base e Equations
- Solving Any Base Equations



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MARK YOUR CALENDAR
End of Topic Test:



How to support your student as they learn

MATH MYTH

Once I understand something, it has been learned.

Learning is tricky for three reasons. First, even when we learn something, we don't always recognize when that knowledge is useful. For example, you know there are four quarters in a dollar. But if someone asks you, "What is 75 times 2?" you might not immediately recognize that is the same thing as having six quarters.

Second, when you learn something new, it's not as if the old way of thinking goes away. For example, some children think of north as straight ahead. But have you ever been following directions on your phone and made a wrong turn, only to catch yourself and think, "I know better than that!"?

The final reason that learning is tricky is that it is balanced by a different mental process: forgetting. Even when we learn something (e.g., your phone number), when you stop using it (e.g., when you move), it becomes extremely hard to remember.

There should always be an asterisk next to the word when we say we learned* something.

#mathmythbusted

Talking Points

Discuss With Your Student

Your student is learning about exponential and logarithmic equations. You can further support your student's learning by asking questions about the work they do in class or at home.

Questions to Ask

- 1 *How does this problem look like something you did in class?*

- 2 *Can you show me the strategy you used to solve this problem? Do you know another way to solve it?*

- 3 *Does your answer make sense? How do you know?*

- 4 *Is there anything you don't understand? How can you use today's lesson to help?*

**KEY TERMS**

Zero Property of Logarithms

The Zero Property of Logarithms states that $\log_b 0 = 1$.

Power Rule of Logarithms

The Power Rule of Logarithms states that $\log_b a^m = m \cdot \log_b a$.

Change of Base Formula

The Change of Base Formula allows you to calculate an exact value for a logarithm by rewriting it in terms of a different base: $\log_b c = \frac{\log_a c}{\log_a b}$, where $a, b, c > 0$ and $a, b \neq 1$.



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MARK YOUR CALENDAR
End of Topic Test:



How to support your student as they learn about Trigonometric Relationships

Mathematics is a connected set of ideas, and your student knows a lot. Encourage them to use the mathematics they already know when encountering new concepts in this topic.

Where are we?



In this MATHbook topic, students examine a reference angle and understand how an angle opens up on the unit circle. The unit circle is then unrolled along the x -axis to demonstrate the key characteristics of periodic functions. Using new understanding of the unit circle, radian measure, and periodic functions, students investigate the sine and cosine functions as well as their characteristics and graphs.

Where have we been? ←

Students have learned the geometric definitions of the sine, cosine, and tangent ratios and used them to solve problems. Students also defined radian measures and explored the side lengths of special right triangles.

Where are we going? →

Trigonometric functions are widely used in advanced calculus courses to model real-world scenarios involving circular motion. In these courses, the use of radian measures leads to simple formulas for derivatives and integrals.



Encourage your students to work through the sequence of MATHia assigned to them. These workspaces deepen their understanding and provide practice with the concepts of **Trigonometric Relationships**.

Trigonometric Relationships

- Understanding the Unit Circle
- Representing Periodic Behavior



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MARK YOUR CALENDAR
End of Topic Test:



How to support your student as they learn

MATH MYTH

There is one right way to do math problems.

Employing multiple strategies to arrive at a single, correct solution is important in life. Suppose you are driving in a crowded downtown area. If one road is backed up, then you can always take a different route. If you know only one route, then you're out of luck.

Learning mathematics is no different. There may only be one right answer, but there are often multiple strategies to arrive at that solution. Everyone should get in the habit of saying: *Well, that's one way to do it. Is there another way? What are the pros and cons?* That way, you avoid falling into the trap of thinking there is only one right way because that strategy might not always work or there might be a more efficient strategy.

Teaching students multiple strategies is important. This helps students understand the benefits of the more efficient method. In addition, everyone has different experiences and preferences. What works for you might not work for someone else.

#mathmythbusted

Talking Points

Discuss With Your Student

Your student is learning about trigonometric functions. You can further support your student's learning by asking questions about the work they do in class or at home.

Questions to Ask

- 1 *How does this problem look like something you did in class?*
- 2 *Can you show me the strategy you used to solve this problem? Do you know another way to solve it?*
- 3 *Does your answer make sense? How do you know?*
- 4 *Is there anything you don't understand? How can you use today's lesson to help?*

**KEY TERMS****periodic function**

A periodic function is a function whose values repeat over regular intervals.

radians

The unit that describes the measure of an angle θ , in terms of the radius and arc length of a unit circle is called a radian. The ratio of the intercepted arc length of a central angle to the radius is the measure of the central angle in radians.

trigonometric function

Trigonometric functions take angle measures (θ values) as inputs and output real number values, which correspond to coordinates of points on the unit circle.



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