TOPIC 1

Real Numbers

In this topic, students extend what they know about numbers to include *irrational* numbers, which are numbers, such as π or $\sqrt{2}$, that cannot be written in the form $\frac{a}{b}$, where a and b are integers and $b \neq 0$. They also learn about integer exponent, powers of 10. and solve problems with scientific notation.

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CONNECT THE MATH

In this topic, students work with numerical and algebraic expressions that include exponents. Expressing numbers with exponents is particularly useful when describing very large and very small quantities.

You and your student can compare the distance between school and the library to the distance between Earth and the sun. How would you express each distance? How many times greater is the distance from Earth to the sun than the distance between school and the library? You can make other comparisons, such as comparing the speed of light with the speed of a car or comparing the weight of an elephant with the weight of a mouse. Scientific notation is a convenient way to express these comparisons.

LESSON 1-1

Rational Numbers as Decimals

Repeating decimals can be represented as an equivalent rational number in fraction form.

LESSON OBJECTIVES

- Write repeating decimals as fractions.

HOW CAN YOU HELP WITH HOMEWORK

Review Lesson Content

Watch and share these video tutorials with your student:
- [How Do You Turn a Repeating Decimal into a Fraction?](#)
- [What is a Repeating Decimal?](#)

You can use these search terms and phrases to help your student find additional help online:
- writing repeating decimals as fractions
- identifying rational decimals

LESSON 1-2

Understand Irrational Numbers

Any number that is not rational is irrational. Irrational numbers are nonrepeating, nonterminating decimals.

LESSON OBJECTIVES

- Identify an irrational number.

HOW CAN YOU HELP WITH HOMEWORK

Review Lesson Content

Watch and share these video tutorials with your student:

- How Do Different Categories of Numbers Compare to Each Other?
- What's an Irrational Number?

Review Key Vocabulary

Review key vocabulary from this lesson in your student's glossary:

- irrational number
- perfect square
- square root

You can use these search terms and phrases to help your student find additional help online:

- identifying irrational numbers
- finding square roots
- classifying numbers as rational or irrational

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LESSON 1-3
Compare and Order Real Numbers

Most square roots are irrational numbers. Strategies such as using perfect squares or decimal expansion are used to compare and order rational and irrational numbers.

LESSON OBJECTIVES

- Compare and order rational and irrational numbers.

HOW CAN YOU HELP WITH HOMEWORK

Review Lesson Content

Watch and share these video tutorials with your student:

- How Do You Put Real Numbers in Order?
- How Do You Estimate the Square Root of a Non-Perfect Square?

You can use these search terms and phrases to help your student find additional help online:

- estimating an irrational number
- ordering rational and irrational numbers
- ordering numerical expressions with irrational numbers

LESSON 1-4

Evaluate Square Roots and Cube Roots

Finding the square root is the inverse operation of squaring a number. Finding the cube root is the inverse operation of cubing, which is raising a number to the third power.

LESSON OBJECTIVES

- Find square roots and cube roots of rational numbers.

HOW CAN YOU HELP WITH HOMEWORK

Review Lesson Content

Watch and share these video tutorials with your student:
- How Do You Find the Square Root of a Perfect Square?
- How Do You Find the Cube Root of a Perfect Cube?

Review Key Vocabulary

Review key vocabulary from this lesson in your student's glossary:
- cube root
- perfect cube

You can use these search terms and phrases to help your student find additional help online:
- solving equations with perfect squares
- solving equations with perfect cubes

LESSON 1-5

Solve Equations Using Square Roots and Cube Roots

The square root of a positive squared number is that number. The cube root of a cubed number is that number.

LESSON OBJECTIVES

- Solve equations and problems, in real-world contexts, involving square roots and cube roots.

HOW CAN YOU HELP WITH HOMEWORK

Review Lesson Content

Watch and share these video tutorials with your student:
- How Do You Find the Square Root of a Perfect Square?
- How Do You Find the Cube Root of a Perfect Cube?

You can use these search terms and phrases to help your student find additional help online:
- solving equations with perfect squares
- solving equations with perfect cubes

LESSON 1-6
Use PROPERTIES of Integer Exponents

Expressions with integer exponents can be simplified using the properties of exponents. The simplified expression will always be equivalent to the original expression.

LESSON OBJECTIVES

- Understand the properties of exponents.
- Generate equivalent expressions with exponents.

HOW CAN YOU HELP WITH HOMEWORK

Review Lesson Content

Watch and share this video tutorial with your student:
- [How Do You Solve a Two-Step Equation by Combining Like Terms?](#)

Review Key Vocabulary

Review key vocabulary from this lesson in your student's glossary:
- [Power of Products Property](#)
- [Product of Powers Property](#)
- [Quotient of Powers Property](#)
- [Power of Powers Property](#)

You can use these search terms and phrases to help your student find additional help online:
- evaluating a power of a product
- evaluating a product of powers

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LESSON 1-7
More Properties of Integer Exponents

A number with a negative exponent indicates multiplication by the reciprocal of that number. A number with an exponent of zero is equal to 1.

LESSON OBJECTIVES
- Simplify expressions with negative and zero exponents.
- Evaluate expressions with negative and zero exponents.

HOW CAN YOU HELP WITH HOMEWORK

Review Lesson Content

Watch and share these video tutorials with your student:
- [What Do You Do with a Negative Exponent?](#)
- [What Do You Do with a Zero Exponent?](#)

Review Key Vocabulary

Review key vocabulary from this lesson in your student's glossary:
- [Negative Exponent Property](#)

You can use these search terms and phrases to help your student find additional help online:
- negative exponent property
- zero exponent property

LESSON 1-8

Use Powers of 10 to Estimate Quantities

Very large and very small numbers can be estimated to help make computations easier, as well as create an understanding of the size of a quantity.

LESSON OBJECTIVES

- Estimate very large and very small quantities using powers of 10.

HOW CAN YOU HELP WITH HOMEWORK

Review Lesson Content

Watch and share this video tutorial with your student:
- [How Do You Rewrite a Decimal as a Power of 10?](#)

You can use these search terms and phrases to help your student find additional help online:
- using a power of 10 to estimate a very large number
- using a power of 10 to estimate a very small number

LESSON 1-9

Understand Scientific Notation

Very large and very small numbers can be estimated using scientific notation in order to make the numbers more convenient to use. Scientific notation also makes it easier to understand the magnitude of a number and compare it with other numbers.

LESSON OBJECTIVES

- Use scientific notation to write large and small numbers.
- Convert numbers in scientific notation to standard form.

HOW CAN YOU HELP WITH HOMEWORK

Review Lesson Content

Watch and share these video tutorials with your student:
- What's Scientific Notation?
- How Do You Convert from Decimal Notation to Scientific Notation?

Review Key Vocabulary

Review key vocabulary from this lesson in your student's glossary:
- scientific notation

You can use these search terms and phrases to help your student find additional help online:
- large numbers in scientific notation
- small numbers in scientific notation
- converting scientific notation to standard form

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LESSON 1-10

Operations with Numbers in Scientific Notation

Number properties can be applied to understand how to add, subtract, multiply, and divide numbers in scientific notation.

LESSON OBJECTIVES

- Apply number properties to calculations with numbers in scientific notation.

HOW CAN YOU HELP WITH HOMEWORK

Review Lesson Content

Watch and share these video tutorials with your student:

- [How Do You Multiply Two Numbers Using Scientific Notation?](#)
- [How Do You Convert from Scientific Notation to Decimal Notation?](#)

You can use these search terms and phrases to help your student find additional help online:
- add and subtract numbers in scientific notation
- multiply numbers in scientific notation
- divide numbers in scientific notation