EUREKA MATH™ TIPS FOR PARENTS

KEY CONCEPT OVERVIEW

In this topic, students learn that every number has a **decimal expansion** that is either **finite** (ending) or infinite (never-ending). Students learn many strategies for writing a fraction as a decimal and vice versa. Students then work with infinite decimals such as 0.33333… and 0.78146925…. This work prepares students for understanding how to approximate an irrational number. Students realize that irrational numbers are different from **rational numbers** because irrational numbers have infinite decimal expansions that do not have a repeating block of numbers. Therefore, the value of an irrational number can only be estimated; it cannot be stated exactly. Students then use a number line to compare the estimated value of an irrational number with a rational number in the form of a fraction, decimal, perfect square, or perfect cube. Finally, students approximate pi (π), the most famous irrational number, by using the area of a quarter circle that is drawn on grid paper. Students use this approximation to determine the approximate values of expressions involving π.

You can expect to see homework that asks your child to do the following:

- Convert fractions to finite or infinite decimals and vice versa.

- Write the **expanded form of a decimal** by using powers of 10.

- Approximate an infinite decimal, identify the size of error in the approximation, and find the decimal's location on a number line.

- Determine whether a number is rational or irrational.

- Approximate irrational square roots and cube roots.

- Order a group of rational and irrational numbers and graph those values (or approximations) on a number line.

- Approximate π and use that approximation in calculations.

SAMPLE PROBLEM *(From Lesson 11)*

Between which two consecutive hundredths does $\sqrt{14}$ lie? Show your work.

The number $\sqrt{14}$ lies between the consecutive hundredths of 3.74 and 3.75.

To begin, the number $\sqrt{14}$ is between 3 and 4 because $3^2 < \left(\sqrt{14}\right)^2 < 4^2$. I then checked the tenths intervals between 3 and 4. Since $\left(\sqrt{14}\right)^2$ is closer to 4^2, I began with 3.9 to 4.0. The number $\sqrt{14}$ is not between those values, so I moved to 3.8 and 3.9. That interval did not work either. The number $\sqrt{14}$ is actually between 3.7 and 3.8 because $3.7^2 = 13.69$ and $3.8^2 = 14.44$. Then I looked at the hundredths intervals between 3.7 and 3.8. Since $\left(\sqrt{14}\right)^2$ is closer to 3.7^2, I began with the interval 3.70 to 3.71. It is not between those values; $\sqrt{14}$ is actually between 3.74 and 3.75 because $3.74^2 = 13.9876$ and $3.75^2 = 14.0625$.

Additional sample problems with detailed answer steps are found in the *Eureka Math Homework Helpers* books. Learn more at GreatMinds.org.

HOW YOU CAN HELP AT HOME

You can help at home in many ways. Here are some tips to help you get started.

▪ Draw a vertical line down the center of a piece of paper to make a chart. Label the left side of the chart *Rational Numbers* and the right side *Irrational Numbers*. Give your child a number. You can find examples of rational and irrational numbers in the lessons in this topic. Have him identify the number as rational or irrational and write it in the correct half of the chart.

▪ Teaching is the best indication of learning. Your child will learn many new techniques for finding the decimal expansions of numbers. Have her teach you a few of these techniques. The techniques include using number lines, long division, powers of ten, and expanded form.

TERMS

Decimal expansion: A number written in decimal form. For example, the decimal expansion of $\frac{3}{4}$ is 0.75.

Expanded form of a decimal: The value of a number written as a sum. For example, 0.125 is written as $\frac{1}{10}+\frac{2}{10^2}+\frac{5}{10^3}$ in expanded form.

Finite decimal: A number with a decimal expansion that ends.

Rational number: A number with a decimal expansion that either ends or is infinite with a repeating block.

MODELS

Decimal Placement on a Number Line