

Chapter 5 Lesson 4

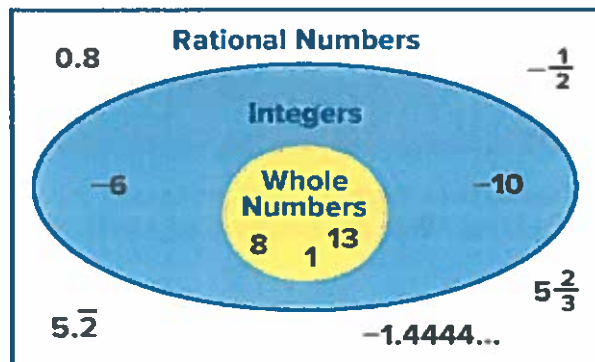
Terminating and Repeating Decimals

> Rational Numbers

Words Rational numbers can be written as fractions.

Algebra $\frac{a}{b}$, where a and b are integers and $b \neq 0$.

Model



Every rational number can be written as a terminating decimal or a repeating decimal.

Terminating Decimal: the decimal form of a rational number which has a repeating digit of zero. (0.6250000000)

Repeating Decimal: the decimal form of a rational number (0.3333333)

EXAMPLES:

Write each repeating decimal using bar notation.

1. $0.733333\dots$

$0.7\bar{3}$

2. $0.424242\dots$

$0.\overline{42}$

3. $0.121212\dots$

$0.\overline{12}$

Fractions, terminating and repeating decimals, percents, and integers are all rational numbers. Every rational number can be expressed as a decimal by dividing the numerator by the denominator.

Rational Number	Repeating Decimal	Terminating Decimal
$\frac{3}{10}$	0.300...	0.3
$\frac{4}{5}$	0.800...	0.8
$\frac{5}{6}$	0.833...	does not terminate

To indicate the number pattern that repeats indefinitely, use bar notation. **Bar notation** is a bar placed over the digits that repeat.

$$0.545454... = 0.\overline{54}$$

$$0.583333... = 0.58\overline{3}$$

Write a Negative Fraction as a Decimal

When writing negative fractions as decimals, the process is the same. Divide as with positive fractions. Write the negative sign in front of the decimal.

EXAMPLES:

Write each fraction as a decimal. Use bar notation if necessary.

$$\begin{array}{r} 25 \overline{) 9.00} \\ \underline{-75} \\ 150 \end{array}$$

$$-\frac{9}{25}$$

$$-0.\overline{36}$$

$$\begin{array}{r} 15 \overline{) 4.000} \\ \underline{-30} \\ 100 \\ \underline{-90} \\ 100 \end{array}$$

$$-\frac{4}{15}$$

$$-0.\overline{26}$$

$$\frac{7}{32}$$

$$0.21875$$

$$\begin{array}{r} 32 \overline{) 7.00000} \\ \underline{-64} \\ 60 \\ \underline{-32} \\ 280 \\ \underline{-256} \\ 240 \\ \underline{-224} \\ 160 \end{array}$$

Write each decimal as a fraction or mixed number in simplest form.

$$-0.9 \quad -\frac{9}{10}$$

$$-\frac{9}{10}$$

$$0.85 \quad \frac{85}{100}$$

$$\frac{17}{20}$$

$$5 \overline{) 85} \quad \frac{17}{20}$$

$$-3.8$$

$$-3\frac{4}{5}$$

$$\frac{8}{10}$$

$$2\frac{8}{5} \quad \frac{10}{4/5}$$