

Skill Check

1.

What is the decimal expansion of the fraction $\frac{7}{9}$?
(Use long division)

7~4 Real numbers

Vocabulary:

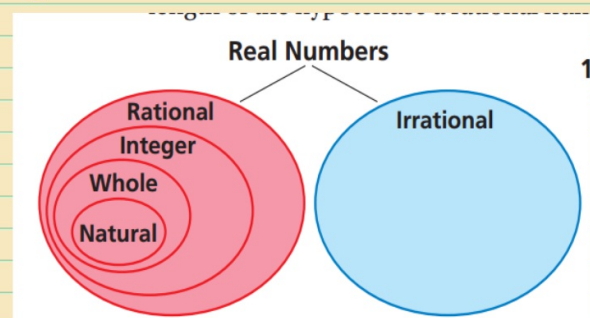
Irrational numbers:

cannot be written as the ratio of two integers.

π $\sqrt{2}$

Real numbers:

Rational numbers and irrational together



Vocabulary practice



- 1.) square root of 12
- 2.) -0.25 repeating
- 3.) negative square root of 9
- 4.) $72/4$
- 5.) π

Practice

Classify the real numbers

1.) $0.121221222\ldots$

2.) $-\sqrt{196}$

3.) $\sqrt[3]{2}$

Example 2
Approximating a square root

Estimate $\sqrt{71}$ to
the nearest a.) integer
b.) tenth

Practice:
Estimate the square root to
the nearest integer and tenth

1.) $\sqrt{8}$

2.) $-\sqrt{13}$

3.) $-\sqrt{24}$

4.) $\sqrt{110}$

Example 3
comparing real numbers

1.) Which is greater

$$\sqrt{5} \text{ or } 2\frac{2}{3}$$

Example 4
Approximating the value of an
expression

Practice:
Which is greater?

1.) $4\frac{1}{5}, \sqrt{23}$

2.) $\sqrt{10}, -\sqrt{5}$

3.) $-\sqrt{2}, -2$

1

Writing a Repeating Decimal as a Fraction (1 Digit Repeats)

Write $0.\overline{4}$ as a fraction in simplest form.

Let $x = 0.\overline{4}$.

$$x = 0.\overline{4}$$

$$10 \cdot x = 10 \cdot 0.\overline{4}$$

$$10x = 4.\overline{4}$$

$$\underline{-(x = 0.\overline{4})}$$

$$9x = 4$$

$$x = \frac{4}{9}$$

❖ So, $0.\overline{4} = \frac{4}{9}$.

Step 1: Write the equation.

Step 2: There is 1 repeating digit, so multiply each side by $10^1 = 10$.

Simplify.

Step 3: Subtract the original equation.

Simplify.

Step 4: Solve for x .

2

Writing a Repeating Decimal as a Fraction (1 Digit Repeats)

Write $-0.2\overline{3}$ as a fraction in simplest form.

Write $-0.\overline{23}$ as a fraction in simplest form.

Let $x = -0.\overline{23}$.

$$x = -0.\overline{23}$$

Step 1: Write the equation.

$$10 \cdot x = 10 \cdot (-0.\overline{23})$$

Step 2: There is 1 repeating digit, so multiply each side by $10^1 = 10$.

$$10x = -2.\overline{3}$$

Simplify.

$$\underline{-(x = -0.\overline{23})}$$

Step 3: Subtract the original equation.

$$9x = -2.1$$

Simplify.

$$x = \frac{-2.1}{9}$$

Step 4: Solve for x .

$$\therefore \text{ So, } -0.\overline{23} = \frac{-2.1}{9} = -\frac{21}{90} = -\frac{7}{30}.$$

3

Writing a Repeating Decimal as a Fraction (2 Digits Repeat)

Write $1.\overline{25}$ as a mixed number.

Write $1.\overline{25}$ as a mixed number.

Let $x = 1.\overline{25}$.

$$x = 1.\overline{25}$$

Step 1: Write the equation.

$$100 \cdot x = 100 \cdot 1.\overline{25}$$

Step 2: There are 2 repeating digits, so multiply each side by $10^2 = 100$.

$$100x = 125.\overline{25}$$

Simplify.

$$\begin{array}{r} 100x = 125.\overline{25} \\ - (x = 1.\overline{25}) \\ \hline \end{array}$$

Step 3: Subtract the original equation.

$$99x = 124$$

Simplify.

$$x = \frac{124}{99}$$

Step 4: Solve for x .

❖ So, $1.\overline{25} = \frac{124}{99} = 1\frac{25}{99}$.

Practice: