Math 8

<u>Our Goal</u>: To learn to write repeating decimals as fractions

<u>Warm Up</u>: Decimal review

<u>Today's homework</u>
Extension 7.4 Practice Handout 1-11

<u>Previous homework</u>
7.4 Exercises, p.313: 4-22 (evens)

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1. Write a whole number that is <u>not</u> a natural #.

2. Write an integer that is <u>not</u> a whole #.

3. Write a rational # that is <u>not</u> an integer.

4. Write an irrational #

5. Classify $\left(\overline{-8.2}\right)$

1.333...

$1.\overline{3}$

rational

Determine if the decimal is *repeating* or *terminating*.

1. 1.222

2. $0.\overline{122}$

0.122122122...

3. $23.\overline{546576}$

4. 43.76676

5. $2.\overline{4439}$
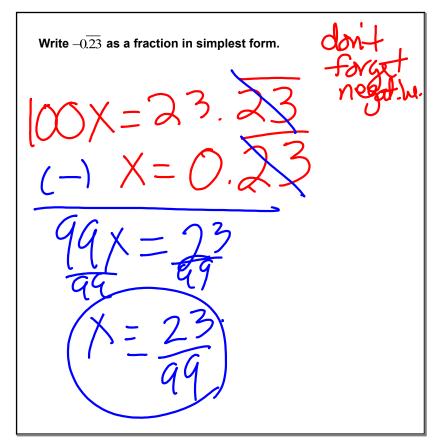
6. $0.3\overline{4}$

0.34444...

Key Idea

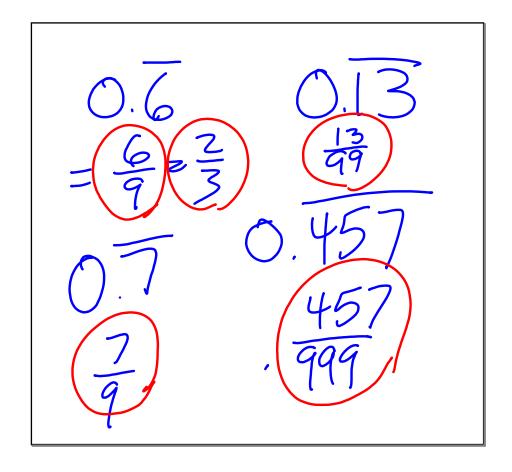**Writing a Repeating Decimal as a Fraction**

Let a variable x equal the repeating decimal d.

Step 1: Write the equation $x = d$.

Step 2: Multiply each side of the equation by 10^n to form a new equation, where n is the number of repeating digits.

Step 3: Subtract the original equation from the new equation.

Step 4: Solve for x.

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

$$10x = 4.\overline{4}$$
$$(-1) \quad x = 0.\overline{4}$$
$$\rule{6cm}{0.4pt}$$
$$9x = 4$$
$$\frac{9x}{9} = \frac{4}{9}$$
$$x = \frac{4}{9}$$

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

don't forget negative.

$$100X = 23.\overline{23}$$

$$(-) \quad X = 0.\overline{23}$$

$$\frac{99X}{99} = \frac{23}{99}$$

$$X = \frac{23}{99}$$

$$0.\overline{6}$$

$$= \frac{6}{9} = \frac{2}{3}$$

$$0.\overline{13}$$

$$\frac{13}{99}$$

$$0.\overline{7}$$

$$\frac{7}{9}$$

$$0.\overline{457}$$

$$\frac{457}{999}$$

$$0.\overline{9} = 1$$

$$\frac{9}{9} = 1$$

$$3.999999999$$

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

$$1 + 0.\overline{25}$$

$$1 + \frac{25}{99} = 1\frac{25}{99}$$

Explain the steps to write $2.\overline{35}$ as a mixed number.

Write $0.1\overline{66}$ as a fraction in simplest form.

$$x = 0.1\overline{6}$$

$$100x = 16.\overline{6}$$

$$(-)\ 10x = 1.\overline{6}$$

$$\frac{90x}{90} = \frac{15}{90}$$

$$x = \frac{15 \div 3}{90 \div 3} = \frac{5}{30} = \boxed{\frac{1}{6}}$$

Write 0.16$\overline{6}$ as a fraction in simplest form.

$0.1\overline{6}$

$1.\overline{6} \div 10$

$1\frac{6}{9} \div 10$

$1\frac{2}{3} \div 10$

$1\frac{2}{3} \cdot \frac{1}{10}$

$1\frac{\cancel{5}}{3} \cdot \frac{1}{\cancel{10}_2} = \frac{1}{6}$

Write 0.08$\overline{3}$ as a fraction in simplest form.

$X = 0.08\,3333\ldots$

$1000X = 83.333\ldots$

$100X = 8.333\ldots$

$\frac{900X}{900} = \frac{75}{900}$

$X = \frac{75}{900} = \boxed{\frac{1}{12}}$

Write 0.416$\overline{6}$ as a fraction in simplest form.