

Repeating Decimals to Fractions

$$.6\bar{3}$$

Step 1: define your
variable

$$x = .6\bar{3}$$

Step 2: determine how many
numbers are repeating in
the decimal.

- 1/6 one multiply by 10

- 1/6 two multiply by 100

- 1/6 three multiply by 1000

$$10x = .6\bar{3}(10)$$

$$10x = 6.\bar{3}$$

Step 3: subtract equation
from step 1 from the one
in step 2.

$$\begin{array}{r} 10x = 6.\bar{3} \\ - x = -.6\bar{3} \end{array}$$

$$9x = 5.7$$

Step 4: isolate the variable

$$\frac{\cancel{9}x}{\cancel{9}} = \frac{5.7}{9}$$

$$x = \frac{5.7}{9}$$

Step 5: can't have a decimal in a fraction so find an equivalent fraction

$$x = \frac{5.7}{9} \left(\frac{10}{10} \right)$$

$$x = \frac{57}{90}$$

Step 6: make sure the fraction is fully reduced

no
there
a d

$$x = \frac{57 \div 3}{90 \div 3}$$

$$x = \frac{19}{30}$$

$$\frac{19}{30} = .6\bar{3}$$

Example 2

$$5.\bar{7}$$

Step 1: $x = 5.\bar{7}$

Step 2: $10x = 5.\bar{7}(10)$

$$10x = 57.\bar{7}$$

$$-x \quad -5.\bar{7}$$

Step 3:

$$\frac{9x}{9} = \frac{52}{9}$$

Step 4:

$$x = 5\frac{7}{9}$$

no step 5 b/c
there wasn't
a decimal

Step 6: $5\frac{7}{9} = 5.\bar{7}$

example 3

$$4.\overline{51}$$

step 1: $x = 4.\overline{51}$

step 2: $100x = 4.\overline{51}(100)$

$$100x = 451.\overline{51}$$

$$- x = 4.\overline{51}$$

Step 3:

$$\frac{99x}{99} = \frac{447}{99}$$

Step 4:

$$x = 4.\overline{51} \div 99 \div 3$$

NO step 5

Step 6:

$$x = 4.\overline{17/33}$$

$$4.\overline{17/33} = 4.\overline{51}$$

Example 4

$$.1\overline{6}$$

$$x = .1\overline{6}$$

$$10x = 1.\overline{6}$$

$$-x = -.1\overline{6}$$

$$\frac{9x}{9} = \frac{1.5}{9}$$

$$x = \frac{1.5}{9} \left(\frac{10}{10} \right)$$

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

$$\boxed{x = \frac{1}{6}}$$

$$\frac{1}{6} = .1\overline{6}$$