

## 7.4 Extension Repeating Decimals as fractions

- since they are rational, they can be written as fractions

\* if the entire decimal is repeating, you can put the number over 9 or 99 or 999 etc. and reduce

$$\text{ex: } 0.\overline{4} = \frac{4}{9} \quad 0.\overline{23} = \frac{23}{99} \quad -1.\overline{2} = -1\frac{2}{9}$$

$$-4.\overline{27} = -4\frac{27}{99} = -4\frac{3}{11}$$

\* if not, follow these steps:

Write  $-0.2\overline{3}$  as a fraction

1.) Let  $x = -0.2\overline{3}$

2.) multiply both sides by 10 b/c there is only 1 repeating digit

3.) subtract the original equation (see #1)

4.) divide by coefficient of x

5.) remove decimal by multiplying the fraction by  $\frac{10}{10}$

$$\begin{array}{r} 10x = -2.\overline{33} \\ - (x = -0.2\overline{3}) \\ \hline 9x = -2.10 \end{array}$$

$$\frac{9x}{9} = \frac{-2.10}{9}$$

$$-\frac{21}{90} = \boxed{-\frac{7}{30}}$$

6.) reduce, if possible

7.) check your answer by dividing the n by the d

$$2.0\overline{6} \quad \text{Let } x = 2.0\overline{6}$$

$$\begin{array}{r} 10x = 20.\overline{66} \\ - (x = 2.0\overline{6}) \\ \hline 9x = 18.60 \end{array}$$

$$x = \frac{18.6}{9} = \frac{186}{90} = \frac{31}{15} = \boxed{2\frac{1}{5}}$$