

## 6.4 Ratios & Proportions

can be written as:

- a to b
- a:b
- $\frac{a}{b}$

When comparing, make sure there is consistency!

⇒ "same" numerators & "same" Denominators (Units)

e.g. ① If 1 inch is 2.54 cm, then how many inches is 1 meter?

We need to know 1 meter = 100 cm

$$\frac{\text{inches}}{\text{cm}} \Rightarrow \frac{1}{2.54} = \frac{x}{100}, \text{ x is inches}$$

"Cross Multiplying"

$$\frac{2.54 \cdot x}{2.54} = \frac{100}{2.54} \Rightarrow x = \frac{100}{2.54} \text{ inches}$$

$$\approx \boxed{39.37 \text{ inches}}$$

② How many miles in 100,000 ft?

1 mile = 5280 ft

$$\frac{\text{miles}}{\text{ft}} \Rightarrow \frac{1}{5280} = \frac{x}{100,000} \quad \text{OR} \quad \frac{\text{ft}}{\text{miles}} \Rightarrow \frac{5280}{1} = \frac{100,000}{x}$$

$$\Rightarrow 5280x = 100,000 \Rightarrow x = \frac{100,000}{5280} \text{ miles} \approx \underline{18.94 \text{ miles}}$$

# Ch. 7 - Decimals

## • Fractions to Decimals

e.g ①  $\frac{1}{2} \Rightarrow$  Long Division

$$\Rightarrow 2 \overline{) 1.00} \Rightarrow \boxed{\frac{1}{2} = 0.5}$$

$\begin{array}{r} 0.5 \\ \underline{-10} \\ 0 \end{array}$  ← Remainder

②  $\frac{1}{3} = ?$   $0.33333\dots = \boxed{0.\overline{3}}$

$$\Rightarrow 3 \overline{) 1.000}$$

$\begin{array}{r} \underline{-9} \\ 10 \\ \underline{-9} \\ 10 \dots \end{array}$

$$\frac{1}{3} = 0.\overline{3} \text{ (EXACT)}$$

$$\frac{1}{3} \approx 0.33 \text{ (Approximately)}$$

③  $\frac{3}{7} = ?$

$$7 \overline{) 3.00000000}$$

$\begin{array}{r} 0.428571 \\ \underline{-28} \\ 20 \\ \underline{-14} \\ 60 \\ \underline{-56} \\ 40 \\ \underline{-35} \\ 50 \\ \underline{-49} \\ 10 \end{array}$

$$\Rightarrow \frac{3}{7} = 0.\overline{428571}$$

Back where we started !!

④

$$\frac{13}{12} = ?$$

$$\boxed{\frac{13}{12} = 1.08\bar{3}}$$

$$\begin{array}{r}
 1.08\bar{3} \\
 12 \overline{) 13.000} \\
 \underline{-12} \quad \downarrow \quad \downarrow \\
 100 \\
 \underline{-96} \quad \downarrow \\
 40 \\
 \underline{-36} \\
 4 \leftarrow \text{cycle}
 \end{array}$$

## • Decimals to fractions

eg. ①  $0.72 = \frac{72}{100} = \frac{\cancel{4} \cdot 18}{\cancel{4} \cdot 25} = \frac{18}{25}$

$\uparrow$  Tenth's  $= \frac{1}{10}$       $\uparrow$  Hundredth's  $= \frac{1}{100}$

$$\boxed{0.72 = \frac{18}{25} \text{ (Simplest Form)}}$$

[If 0.725, then write as  $\frac{725}{1000}$  and reduce!]

②

Repeating Decimals!  
suppose:  $0.4\bar{1} = ?$

Let  $x = 0.4\bar{1} \Rightarrow 10x = 4.\bar{1} = 4.1111\dots$   
 and  $100x = 41.\bar{1}$

$$\begin{array}{r}
 100x = 41.\bar{1} \\
 - 10x = -4.\bar{1} \\
 \hline
 90x = 37
 \end{array}
 \Rightarrow \boxed{0.4\bar{1} = \frac{37}{90}}$$

← Subtracting

③

$$2.\overline{57} = ?$$

$$\text{Let } x = 2.\overline{57} = 2.5757\dots$$

$$\Rightarrow 100x = 257.\overline{57}$$

$$\begin{array}{r} -x = -2.\overline{57} \\ \hline \end{array}$$

$$99x = 255 \Rightarrow$$

$$x = \frac{255}{99} = \frac{3 \cdot 85}{3 \cdot 33} = \frac{85}{33}$$

$$\Rightarrow \boxed{2.\overline{57} = \frac{85}{33}}$$

④

$$0.6\overline{80} = ?$$

$$\text{Let } x = 0.6\overline{80} = 0.68080\dots$$

$$\Rightarrow 10x = 6.\overline{80} = 6.8080\dots$$

$$\text{and } 1000x = 680.\overline{80}$$

$$\begin{array}{r} -10x = -6.\overline{80} \\ \hline \end{array}$$

$$990x = 674$$

$$\Rightarrow x = \frac{674}{990} = \frac{2 \cdot 337}{2 \cdot 495} = \frac{337}{495}$$

$$\Rightarrow \boxed{0.6\overline{80} = \frac{337}{495}}$$

} to get the Repeating part to "align" !!