

6.2 Finding Percent and Part

Repeating Decimals proof.

Ex 1. $0.\overline{4} = \boxed{\frac{4}{9}}$

Let $x = 0.4444\dots$

$$\begin{array}{r} 10x = 4.4444\dots \\ - x = 0.4444\dots \\ \hline \end{array}$$

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

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

Ex 2. $0.\overline{21} = \boxed{\frac{7}{33}}$

Let $x = 0.212121\dots$

$$\begin{array}{r} 100x = 21.2121\dots \\ - x = 0.2121\dots \\ \hline \end{array}$$

$$\frac{99x}{99} = \frac{21}{99}$$

$$x = \frac{21}{99} = \frac{7}{33}$$

Ex 3. $0.\overline{46} = \boxed{\frac{7}{15}}$

Let $x = 0.46666\dots$

$$\begin{array}{r} 10x = 4.6666\dots \\ - x = 0.4666\dots \\ \hline \end{array}$$

$$\frac{9x}{9} = \frac{4.2}{9}$$

$$x = \frac{4.2}{9} = \frac{42}{90} = \frac{7}{15}$$

Try Ex 1. $0.\overline{385} = \boxed{\frac{191}{495}}$

Let $x = 0.3858585\dots$

$$\begin{array}{r} 1000x = 38.5858\dots \\ - x = 0.3858\dots \\ \hline \end{array}$$

$$\frac{999x}{999} = \frac{38.2}{999}$$

$$x = \frac{38.2}{999} = \frac{382}{9990} = \frac{191}{4995}$$

Finding Percent

Ex 2. $0.35\overline{8} = \boxed{\frac{323}{900}}$

Let $x = 0.35888\dots$

$$\begin{array}{r} 10x = 3.5888\dots \\ - x = 0.3588\dots \\ \hline \end{array}$$

$$\frac{9x}{9} = \frac{3.23}{9}$$

$$x = \frac{3.23}{9} = \frac{323}{900}$$

Short cut

after d.p. - repeating

9 for repeating # & 0 for non-repeating #

$$\frac{\text{Part}}{\text{Total}} \times 100 = \text{Percent}$$

1. 20 out of 65 = 30.77 %

$$\frac{20}{65} \times 100 \approx 30.77$$

2. 72 out of 60 = 120 %

$$\frac{72}{60} \times 100 = 120$$

3. 1 out of 500 = 0.2 %

$$\frac{1}{500} \times 100 = 0.2$$

4. A box of cereal is 375g. The new size is 450g. What percent of the original size is the new size?

$$\frac{450}{375} \times 100 = 120\%$$

\therefore 120% of the original size is the new size.

Finding the Percent of a Number (Part)

15% of 60

→ multiply

15% of 60	
Method 1	Method 2
$\frac{15}{100} \times 60 = \frac{x}{60} \times 60$ $x = 9$	$\frac{15}{100} \times 60$ $= 9$

1. 8% of 30cm $\frac{8}{100} \times 30 = 2.4\text{cm}$

2. $2\frac{1}{2}\%$ of 500g $\frac{2\frac{1}{2}}{100} \times 500 = 12.5\text{g}$

3. 150% of \$10 $\frac{150}{100} \times 10 = \15

4. $\frac{7}{8}\%$ of 80 $\frac{\frac{7}{8}}{100} \times 80 = 0.7$

5. A \$59.95 item is on sale for 20% off.

a) What is the discount?

$$20\% \text{ of } \$59.95 = \frac{20}{100} \times 59.95 = \$11.99$$

∴ The discount is \$11.99

b) What is the sale price?

$$59.95 - 11.99 = \$47.96$$

∴ The sale price is \$47.96

c) What is the final price including 11% tax?

$$111\% \text{ of } \$47.96 = 1.11 \times 47.96 = \$53.24$$

∴ The final price is \$53.24

6. An iceberg decreases in height by 15% every 10 years. If it was 75 meters tall how tall will it be in 10 years? 20 years, 100 years?

10 years $75(0.85)^{10} = 14.77\text{m}$ ~~63.75~~

20 years $75(0.85)^{20} = 2.91\text{m}$ ~~54.1875~~

100 years $75(0.85)^{100} = 6.56 \times 10^{-6}\text{m}$
14.77

∴ The iceberg will be 14.77m in 10 years, 2.91m in 20 years, and $6.56 \times 10^{-6}\text{m}$ in 100 years.

Assignment: p.136 #13, 14, 16, 19, 20 and p142 #5-14, 16