Percentages – A Review

What is a percentage?

- It is a **ratio**… AKA a fraction!

- The **general form** of a percentage is:

$$\frac{anything}{100} \qquad \boxed{\textbf{A number out of 100}}$$

Examples:

$$\frac{78}{100} \text{ is } 78\% \qquad \frac{5}{100} \text{ is } 5\% \qquad \frac{23}{100} \text{ is } 23\%$$

- When we are working with **percentages**, we have to first represent them as **decimals**

- **Since they are out of 100, think about pennies!**

Converting Percentages to Decimals and Vice Versa

- Think of percentages in terms of money…

$$100\% = \$1.00$$
$$76\% = \$0.76$$
$$50\% = \$0.50$$
$$23\% = \$0.23$$
$$4\% = \$0.04$$

- So if I have a decimal, I can easily convert it to a percentage.

$$0.45 = 45\%$$
$$0.61 = 61\%$$
$$1.20 = 120\%$$
$$0.003 = .3\%$$

Examples:

$36\% = \dfrac{36}{100} = 0.36$ $78\% = \dfrac{78}{100} = 0.78$ $64\% = \dfrac{64}{100} = 0.64$

$25\% = \dfrac{25}{100} = 0.25$ $54\% = \dfrac{54}{100} = 0.54$ $40\% = \dfrac{40}{100} = 0.40$

The only hiccup is when you have a decimal as a percentage already.

$25.5\% = \dfrac{25.5}{100} = 0.255$ $12.5\% = \dfrac{12.5}{100} = 0.125$ $7.5\% = \dfrac{7.5}{100} = 0.075$

$3.25\% = \dfrac{3.25}{100} = 0.0325$ $45.8\% = \dfrac{45.8}{100} = 0.458$ $0.1\% = \dfrac{0.1}{100} = 0.001$

Figuring out Percentages of Numbers

- This is used all the time when we think about **discounts, deals, or calculating the tip**
- All we need to do is some good old fashion multiplication!
- We **multiply** the **percentage in the form of a decimal** by the **amount**.

Practice:

1. What is 37% *of* 200?   Need to convert to decimal

    37% → 0.37   200 · 0.37 = 74

2. What is 8.5% *of* 86?

    8.5% → 0.085   86 · 0.085 = 7.31

3. What is 43% of 1200?

$43\% \rightarrow 0.43$ $1200 \cdot 0.43 = \boxed{516}$

4. What is 3.5% of 880?

$3.5\% \rightarrow 0.035$ $880 \cdot 0.035 = \boxed{30.8}$

This works the same way with money

Practice:

5. What is 12.5% *of* $45?

$12.5\% \rightarrow 0.125$ $45 \cdot 0.125 = \boxed{\$\,5.63}$

6. What is 20% *of* $120?

$20\% \rightarrow 0.20$ $120 \cdot 0.20 = \boxed{\$\,24}$

7. So if the deal is for 25% *off of* $150, how much would you have to pay?

$25\% \rightarrow 0.25$ so $150 - 37.50$

$150 \cdot 0.25 = \$\,37.50$ $\boxed{\$\,112.50}$

8. If you buy a new TV for $899, and you get a 15% *discount*, how much is it?

15% → 0.15

899 - 134.85 = $764.15

899 · 0.15 = $ 134.85
off

- We can use this to **calculate tax** and the **total** we have to pay too!
  - o We first have to convert the tax from a **percentage to a decimal**
  - o Next we **multiply by the price**
  - o Then we **add that amount** to the **original price** to find the total we have to pay

Practice:

9. That is the final purchase price of a $59 item with 5.5% *GST*?

5.5% → 0.055

59 + 3.25 = $62.25

59 · 0.055 = $ 3.25
tax

10. What is the final purchase price of a $145 pair of shoes with 12% *tax*?

145 · 0.12 = $17.40
tax

145 + 17.40 = $162.40

12% → 0.12

11. What is the final purchase price of a $899.95 PS5 with 7.5% *tax*?

7.5% → 0.075

899.95 + 67.50

899.95 · 0.075 = $67.50
tax

$ 967.45