

## Decimals and Percents (App B)

### To change percent to decimal

Divide by 100 and drop percent sign **OR** multiply by .01 and drop percent sign **OR** move decimal 2 places to the left and drop percent sign.

Example:

$$32\% = 32/100 = 0.32 \quad \text{OR} \quad 32\% = 32(.01) = 0.32 \quad \text{OR} \quad 32\% = \underset{\leftarrow 1}{32.0}\% = 0.32$$

If percent is written as a fraction, change to decimal first, then proceed as above.

Example:

$$\frac{1}{2}\% = 0.5\% \text{ (divide 1 by 2)} = .005$$

### To change decimal to percent

Multiply by 100 and write percent symbol **OR** move decimal 2 places to the right and write percent symbol.

Example:

$$0.75 = 0.75(100)\% = 75\% \quad \text{OR} \quad \underset{\downarrow}{0.75} = 75\%$$

### Basic Percent Problems

Consider a basic percent statement.

$$\begin{array}{ccccccc} 5 & \text{is} & 10\% & \text{of} & 50 & & \\ & & \downarrow & & \downarrow & \downarrow & \\ 5 & = & (.10) & \cdot & 50 & & \end{array}$$

In a word problem, any of these 3 quantities could be the “unknown”.

Examples:

What number is 10% of 50?

$$\begin{array}{ccccccc} \downarrow & \downarrow & \downarrow & \downarrow & & & \\ x & = & (.10) & \cdot & (50) & & \end{array}$$

5 is 10% of what number?

$$\begin{array}{ccccccc} \downarrow & \downarrow & \downarrow & \downarrow & \downarrow & & \\ 5 & = & (.10) & \cdot & x & & \end{array}$$

What percent of 50 is 5?

$$\begin{array}{ccccccc} \downarrow & \downarrow & & \downarrow & & & \\ x & \cdot & (50) & = & 5 & & \end{array}$$

(Note in this last example that when you solve for x, it will come out as a decimal! Don't forget to change it to a percent.)

Many word problems involving percent have to do with sales, discounts, or bank accounts. Think about how these situations work:

$$\text{Sales tax} = (\text{Tax percent as a decimal}) \cdot (\text{Price of item})$$

$$\text{Total cost} = \text{Price of item} + \text{Sales tax}$$

$$\text{Sale price} = \text{Original price} - (\text{Percent discount as a decimal}) \cdot (\text{Original price})$$

$$\text{Interest} = (\text{Principal}) \cdot (\text{Interest rate as a decimal}) \cdot (\text{Time in bank})$$

$$\text{Total amount of money in account} = \text{Principal} + \text{Interest}$$

Example:

After a 40% price reduction, a shirt is on sale for \$9.60. What was the original price?

Let  $x$  = the original price

$$\text{Sale price} = \text{original price} - (\text{percent reduction as a decimal}) \cdot (\text{original price})$$

$$9.60 = x - (.40) \cdot x$$

$$9.60 = 1x - .40x$$

$$9.60 = .60x$$

$$16 = x$$

“The original price of the shirt was \$16.”

**Problems**

1. Change 125% to a decimal.
2. Change  $\frac{2}{5}$  to a percent.
3. What is 21% of 81?
4. What percent of 243 is 48.6?
5. 56 is 140% of what number?
6. On a test with 80 questions, a student got 64 correct. What percent did they get correct?
7. Mike paid a total of \$266.25 for a camera. The total included a 6.5% sales tax. What was the price of the camera?
8. Money is invested in a savings account at a rate of 5% simple interest. After one year, there is \$254.10 in the account. How much was originally invested?
9. One number is 25% of another. The larger number is 12 more than the smaller. What are the numbers?

**Answers**

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|----------|----------|-------------|
| 1. 1.25  | 5. 40    | 9. 16 and 4 |
| 2. 40%   | 6. 80%   |             |
| 3. 17.01 | 7. \$250 |             |
| 4. 20%   | 8. \$242 |             |