

Percent

A **percentage** expresses a part **out of a hundred** (per cent = per hundred).

Example #1:

75 percent (or 75%) can be expressed as $\frac{75}{100}$ ← 75 parts out of 100 parts

$\frac{75}{100} = \frac{3}{4}$ ← Express in lowest form

Now we see that percentages can be expressed as fractions. How else can we express percentages?

Example #2:

If we can get a **fraction** from a percentage, that means we can get a decimal, too.

$$\frac{3}{4} = 3 \div 4 = 0.75$$

Now we see that **percentages can be expressed in fractions and in decimals:**

$75\% = \frac{3}{4} = 0.75$ ← To convert a **decimal into percent**, you **multiply it by 100**. ($0.75 \times 100 = 75\%$)

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Finding Percentages

Example #2:

What percentage is **40** out of **64**?

a) We have a fraction, $\frac{40}{64}$

b) A fraction can be expressed as a decimal: $\frac{40}{64} = 0.625$

c) Decimal to percentage, multiply by 100: $0.625 \times 100 = 62.5\%$

d) Answer: $\frac{40}{64} = 62.5\%$

Example #3:

How might you find **70%** of **50**?

a) You can express **70%** as $\frac{7}{10}$ (lowest form of $\frac{70}{100}$) or **0.7** (7 divided by 10).

b) Multiply **50** by $\frac{7}{10}$ or by **0.7**.

c) $50 \times \frac{7}{10}$ (or **0.7**) = **35**

d) Answer: **35** is **70%** of **50**.

***Note: If you don't have a calculator on hand for this method, using fractions to calculate percentages is usually easier.**

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Example #4:

25% of what number is 12?

- a) If we want to find **25%** of a number, we multiply the number by **0.25**, or $\frac{1}{4}$ (like in Example #3).
- b) To reverse the effect—to find **the number** from **12** (**25%** of the number)—we can divide (**Reason:** the opposite of multiplication is division).
- c) $12 \div 0.25 = 48$
- d) Check: $\frac{12}{48} = 0.25 = 25\%$

Alternate Method:

If **12** is **25%** of a number, then $\frac{12}{25}$ is one percent.

To get **100%** of the original number, we multiply $\frac{12}{25}$ by **100**.

$$\frac{12}{25} \times 100 = \frac{1200}{25} = 48$$

Questions

1. Solve. Round answers to the nearest tenth.

a) 30% of 80 b) 25% of 80 c) 75% of 60 d) 15% of 9

e) 70% of 85 f) 10% of 65 g) 20% of 200 h) 67% of 225

2. Express each fraction as a percent. Round to the nearest tenth of a percent.

a) $\frac{1}{4}$ b) $\frac{3}{4}$ c) $\frac{2}{5}$ d) $\frac{4}{5}$ e) $\frac{2}{3}$

f) $\frac{3}{5}$ g) $\frac{4}{7}$ h) $\frac{4}{9}$ i) $\frac{11}{17}$ j) $\frac{26}{33}$

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3. Express each percent as a fraction in lowest form.

a) 0.25 b) 0.75 c) 0.8 d) 0.65 e) 0.98

f) 0.35 g) 0.67 h) 0.68 i) 0.5 j) 0.76

4. Jonathan received an 85% on his grade nine math test:

a) If the test was out of 20, what was his mark out of 20?

b) If Jonathan received 170 marks on the test, what was the test out of?

Answers

1. a) 24 b) 20 c) 45 d) 1.4
 e) 59.5 f) 6.5 g) 40 h) 150.8

2. a) 25% b) 75% c) 40% d) 80% e) 66.7%
 f) 60% g) 57.1% h) 44.4% i) 64.7% j) 78.8%

3. a) $\frac{1}{4}$ b) $\frac{3}{4}$ c) $\frac{4}{5}$ d) $\frac{13}{20}$ e) $\frac{49}{50}$
 f) $\frac{7}{20}$ g) $\frac{67}{100}$ h) $\frac{17}{25}$ i) $\frac{1}{2}$ j) $\frac{19}{25}$

4. a) 17 b) 200