

Math Study Guide: Percents, Fractions, and Ratios

Converting Fractions and Percents

1. To convert from a percent to a fraction:

- Write the number without a percent sign
- Multiply by 1/100 to turn it into a fraction
- Reduce the resulting fraction to lowest terms

Example:

Convert 15% to a fraction.

$$\begin{aligned} 15\% &\text{ becomes } 15 \\ 15 \times \frac{1}{100} &= \frac{15}{100} \\ \frac{15}{100} &= \frac{3}{20} \\ 15\% &= \frac{3}{20} \end{aligned}$$

2. To convert from a fraction to a percent

- Multiply the fraction by 1/100
- Divide the numerator (top #) by the denominator (bottom #)
- Add the % sign to the result

Example:

Convert 3/20 to a percent.

$$\frac{3}{20} \times \frac{1}{100} = \frac{300}{20} \text{ (remember to "cross multiply")}$$

$$\begin{aligned} 300 \div 20 &= 15 \\ \frac{3}{20} &= 15\% \end{aligned}$$

Solving Percent Problems using Proportions

- part/total = percent/100
(use x to indicate the unknown)

1. Find the part when the percent and total are known

25% of 16 is what number?

The percent is known, the total is known, the part is unknown (x) so

$$\begin{aligned} \frac{x}{16} &= \frac{25}{100} && \text{now, cross-multiply} \\ 100x &= 16 \times 25 \\ 100x &= 400 && \text{solve for x by dividing} \\ x &= \frac{400}{100} \\ x &= 4 && \text{25\% of 16 is 4} \end{aligned}$$

2. Find the total when the part and percent are known

25% of what number is 10?

The percent is known, the part is known, the total is unknown (x) so

$$\begin{aligned} \frac{10}{x} &= \frac{25}{100} && \text{now, cross-multiply} \\ 25x &= 1000 \\ x &= \frac{1000}{25} && \text{solve for x by dividing} \\ x &= 40 && \text{25\% of 40 is 10} \end{aligned}$$

3. Find the percent when the part and total are known

What percent of 200 is 50?

The total is known, the part is known, the percent is unknown (x) so

$$\begin{aligned} \frac{x}{100} &= \frac{50}{200} && \text{now, cross multiply} \\ 200x &= 5000 \\ x &= \frac{5000}{200} && \text{solve for x by dividing} \\ x &= 25 && \text{25\% of 200 is 50} \end{aligned}$$

Practice Solving Percent Problems using Proportions

- $\text{part}/\text{total} = \text{percent}/100$ (use x to indicate the unknown)

Find the part when the percent and the total are known

1. 20% of 40 is what number?
2. 5% of 75 is what number?
3. 25% of 800 is what number?
4. What is 12% of 55?
5. What is $12\frac{1}{2}\%$ of 55?
6. What is $43\frac{1}{2}\%$ of 950?
7. Ed got 65% on a test out of 80. What mark did he get?
8. 75% of the solution is water. How much water is there in 500 ml of solution?

Find the total when the part and percent are known

9. 25 is 50% of what number?
10. 72 is 20% of what number?
11. 8 is 75% of what number?
12. Ed received \$5,000, which was 25% of the total winnings. What was the total amount of winnings?
13. Ed got 62% of the total votes. He got 740 votes. How many votes were cast?
14. Jan phoned 12% of the people on the voters' list. She phoned 100 people. How many names were on the list?

Find the percent when the part and the total are known

15. 16 of the 920 ballots were spoiled. What percentage of the ballots were spoiled?
16. 3 of the 24 flowers in the bouquet are red. What percentage of flowers are red? What percentage of flowers were not red?
17. 2 of the 24 children in the class were not present. What percent was present?
18. Of the 28 homes on the street, 2 were not lit up for Christmas. What percentage of homes had lights?
19. The following deductions were made from Ed's gross earnings of \$1,245.75. What is the percentage of each deduction? Round your answers to one decimal place.
 - a. Income tax = \$249.34
 - b. CPP = 24.45
 - c. Employment Insurance = \$19.72
 - d. Union dues = 20.00