PERCENTS: FINDING PERCENT AND PART

SOLVING PROBLEMS USING PERCENT

Percents are useful in solving everyday math problems. One type of percent problem is "finding percent" where a proportion may be used to express the fraction as a percent.

A tool that can be very helpful in solving percent problems is the "percent box". The percent box may be used to help set up a proportion for "finding percent".

The percent box may also be used to solve a second type of percent problem called "finding the part" which is finding a percent of a number.

Learning to solve percent problems will be very useful in every day math applications.

Finding Percent for a Fraction Using a Proportion

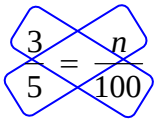
When finding a percent for a fraction, write a proportion to express the fraction in hundredths.

Find the percent for $\frac{3}{5}$.

Write a proportion

$$\frac{3}{5} = \frac{n}{100}$$

Cross Multiply



Write the cross products as an equation.

$$5 \times n = 3 \times 100$$

$$5n = 300$$

Divide both sides by 5

$$5n \div 5 = 300 \div 5$$

Solve.

$$1n = 60$$

$$n = 60\%$$

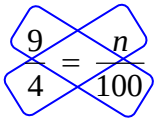
Here is an example for expressing an improper fraction as percent.

Find the percent for $\frac{9}{4}$.

Write a proportion

$$\frac{9}{4} = \frac{n}{100}$$

Cross Multiply



Write the cross products as an equation.

$$4 \times n = 9 \times 100$$

$$4n = 900$$

Divide both sides by 5

$$4n \div 4 = 900 \div 4$$

Solve.

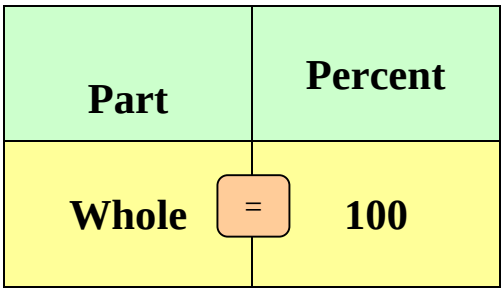
$$1n = 225$$

$$n = 225\%$$

Percents (Percent-Box Method)

To solve percent problems, the percent box comes in handy to set up the problem.

Finding Percent

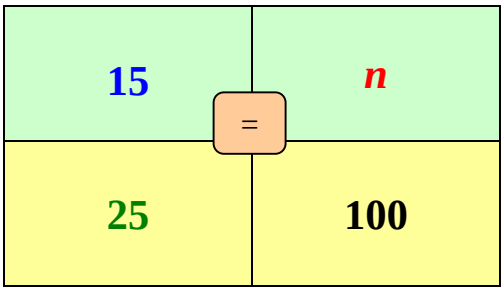


Example 1: **Fifteen** middle school students ride the school bus. In all, **twenty-five** students ride the bus. **What percent** of the students that ride the bus are middle school students?

The math sentence for this problem is:

Fifteen is what percent of 25?

"**15** middle school students" is the **part** of the students riding the bus.



"**What percent** of the students are middle school students?" is the unknown (***n***). The **percent** goes above the 100 in the percent box.

"**25** students in all" is the **whole** number of students riding the bus.

To solve for percent, make a proportion, and then cross multiply.

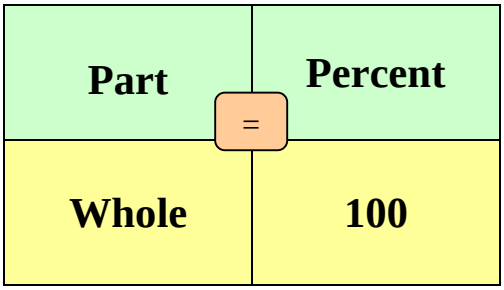
$$\frac{15}{25} = \frac{n}{100} \xrightarrow{\text{cross multiply}} 25 \times n = 15 \times 100 \xrightarrow{\text{make an equation}} 25n = 1500 \quad (1500 \div 25)$$

$$n = 60$$

60% of the students who ride the bus are middle school students.

Finding Part

To solve percent problems, the percent box comes in handy to set up problem.

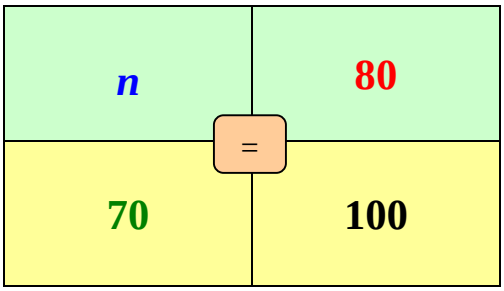


Example: There are **70** students in the class. **Eighty percent** have blue eyes. **How many** students have **blue eyes**?

The math sentence for this problem is:

80% of 70 = *n*

"How many have **blue** eyes?" is the **part** that is **unknown**.



Eighty percent have blue eyes. The **percent** goes above the 100 in the percent box.

"**70** students in the class" is the **whole** number of students.

To solve for "part" of the class, make a proportion, and then cross multiply.

$\frac{n}{70} = \frac{80}{100}$ $\xrightarrow{\text{cross multiply}}$ $n \times 100 = 70 \times 80$ $\xrightarrow{\text{make an equation}}$ $100n = 5600$ $(5600 \div 100)$

$n = 56$

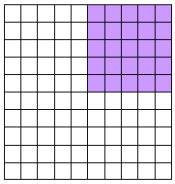
Fifty-six students in the class have blue eyes.

Using Percents

Lyle went shopping with his mom and found a jacket that was on sale marked **25% off**. The cost of the jacket was approximately $40.00. He wanted to figure the savings quickly.

Here is how Lyle figured his discount.

From math class, Lyle remembered that 25% can be written as a fraction, $\frac{25}{100}$, and then simplifed to $\frac{1}{4}$.



He multiplied $\$40 \times \frac{1}{4}$ and figured that the discount was $10.

He subtracted $\$40 - \$10$.

Lyle told his mom that the jacket only costs $30 on sale.

Lyle's mother had a calculator in her purse and decided to check his math. She found the discount another way. She thought of 25% as the decimal, 0.25, and then multiplied by $40.00. She also figured $10 for the discount. Since$10 was a good discount on the jacket and the final price of $30 was reasonable, Lyle took home a new jacket!

$$\begin{array}{r} 40 \\ \times\ 0.25 \\ \hline 200 \\ 80 \\ \hline 10.00 \end{array} \qquad \begin{array}{r} \$40 \\ -10 \\ \hline \$30 \end{array}$$