

Goals: To solve basic percent problems by understanding the connection of percents to proportions or equivalent fractions. From here we will simplify the process to solving proportion problems.

In this section we will try to

- Understand what is it that is really being asked of us in this section.
 - Realize the relationship of equivalent fractions/proportions to percents
 - Distil the problems down to solving the proportion “is over of = percent over 100”

Understand what is it that is really being asked of us in this section

Consider the problem of grades again:

What is the percentage you get if you score 42/60 on a test?

The book would ask this question in a more general way devoid of meaning like this, “what percent is 42 out of 60?”

The trick is to realize that the book is asking questions to problems you often find yourself in, and may very well want to know.

When you are asked:

“what is 30% of 75”, what you may just as well have been thinking is “How much money will be taken off a 75\$ pair of shoes if it is 30% off?” These are the same questions but with different words.

“50 is 40% of what number”, is also the same question as “if your new pants cost you 50\$ and you only had to pay 40% of the original price, then what is the original price?”

“5 is what percent of 8” is the same situation when you wonder “what grade percent did I get if I got 5 out of 8 on my last quiz?”

And thankfully all these questions are different versions of the same problem with percents. This stems from the idea that a percent is a proportion, the statement that two ratios or rates are equal.

In each problem there *is* a **part**, *of* some **whole**, that *is* equal to a **percent**, and percents are always out of 100.

So in every basic percent problem we are really being asked to recognize that:

**Part of some whole can always be written as an equivalent fraction out of 100.

$$\frac{\text{part}}{\text{whole}} = \frac{\text{percent}}{100}$$

In every problem in this section, your real job is to figure out what number represents that part, the whole, and the percent! Once you do that, you just solve the proportion!!

Translate each *question* to an *equation* and solve.

a) What number is 70% of 80?

b) What number is 10% of 216?

i) What percent of 40 is 20?

ii) What percent of 9 is 3?

1) 42 is 70% of what number ?

2) 34 is 25% of what number?

Example problems:

1. a) 50% of what number is 10?

b) 20% of what number is 5?

2. a) What is 20% of 40?

b) What is 25% of 8?

c) 150% of 8 is what number?

d) 8.5% of 600 is what number?

e) What is $66\frac{2}{3}\%$ of 33?

f) Compute $\frac{1}{10}\%$ of 45.

3. a) 12% of what number is 6?

b) 4% of what number is 8?

c) 0.75% of what number is 24?

d) 108 is 120% of what number?

4. a) What percent of 6 is 5?

b) What percent of 80 is 60?

c) What percent of 8 is 9?

d) 1.5 is what percent of 5?

Answers:

1a) 20 1b) 25

2a) 8 2b) 2 2c) 12 2d) 51 2e) 22 2f) .045

3a) 50 3b) 200 3c) 3200 3d) 90

4a) $83.\bar{3}\% = 83\frac{1}{3}\%$ 4b) 75% 4c) $112.5\% = 112\frac{1}{2}\%$ 4d) 30%