

# Read About Percents

## WHAT ARE PERCENTS?

Percents are special ratios where the whole is always 100. You use the % symbol to represent “percent.” 5 out of 100 or 5 : 100 is 5%.

*To better understand percents...*

## LET'S BREAK IT DOWN!

### Playing Basketball

Amari and Emily are shooting hoops. Amari scored 72 out of 100 shots. Emily scored 80 out of 100 shots. How can you represent these as ratios and percents? A ratio is a relationship between two numbers. Ratios can be part-part or part-whole. Because we are looking at the number of scores (part) out of the number of shots (whole), we know that the ratio is part-whole. This is important because percents can only represent part-whole ratios. We can represent Amari's score as 72 :100 or  $\frac{72}{100}$  or  $\frac{72}{100}$  or 72%. We can also represent Amari's score as a decimal number where 1 is the whole, as 72 hundredths or 0.72. [b]Try this yourself: What are all the ways you can represent Emily's score? What is her score as a percent and as a decimal?[/b]



## Class Lunch

We are going on a class trip to the local science museum and need to plan for lunch. We surveyed the food preferences of the class, and 5 out of 20 students said they are vegetarian.

We can represent this ratio as 5 :20

or  $\frac{5}{20}$  or  $\frac{5}{20}$ . But how do we

represent this ratio as a percent?

First we need to convert our ratio to

an equivalent ratio out of 100. To make an equivalent ratio we multiply both parts of the ratio by the same number. We know that  $20 \times 5 = 100$ , so we need to multiply the numerator by 5 as well:

$5 \times 5 = 25$ . That means the equivalent ratio is 25 :100 or  $\frac{25}{100}$  or 25%. So 25% of the students in the

class are vegetarians. [b]Try this yourself: 7 out of 25 students in Emily's class are vegetarian.

What percent of her class is vegetarian?[/b]

$$\frac{7}{25} \times 4 = \frac{28}{100} = 28\%$$

I KNOW THAT 7 OUT OF 25 STUDENTS IN MY CLASS ARE VEGETARIAN. WHAT PERCENT IS THAT?

## Calculating Homework

Emily has already read 80% of the books she needs for the year, and she has read 8 books. How many total books does she need to read this year? First, set up a ratio for this situation. Emily has read 8 out of an unknown total number of books, so

we can write that as  $\frac{8}{0}$ , or  $\frac{8}{0}$ . We

know that the number of books she

has read is 80% of the total books, so we can set up an equation:  $\frac{8}{0} = \frac{80}{100}$ . We need to multiply the numerator and denominator of our ratio by the same number to keep the ratios equivalent.

We know that  $8 \times 10 = 80$ , so  $\frac{8}{0} \times 10 = \frac{80}{100}$ . That means  $\frac{8}{0}$  must equal 10. The total number of

books Emily needs to read is 10. [b]Try this yourself: Amari has read 90% of the books she needs

for the year, and she has read 18 books so far. How many total books does she need to read this

$$\frac{8}{10} \times 10 = \frac{80}{100}$$

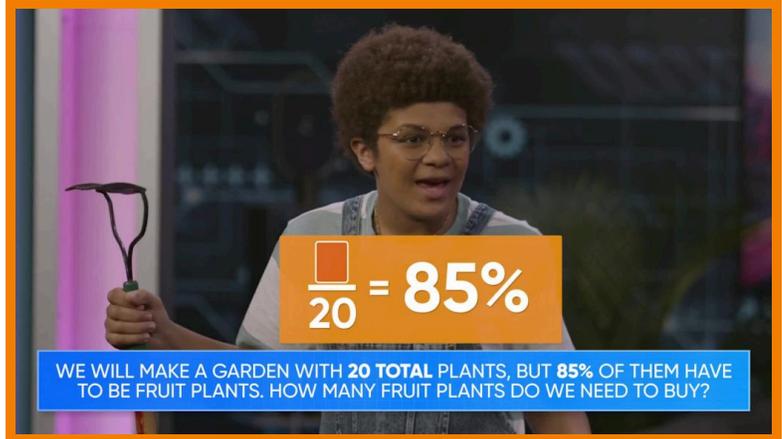
I COMPLETED 80% OF MY READING GOAL FOR THE YEAR AND I KNOW I READ 8 BOOKS. HOW MANY TOTAL BOOKS DO I NEED TO READ?

year?[/b]

## Planting a Garden

We can also find the amount of a part for a given percent. We need to plant a garden with 20 plants in total, and 85% of the plants need to be fruit plants. We start by setting up an equation with the information we already know:  $\frac{0}{0} = \frac{0}{100}$ . Then we fill in the values we know, to get  $\frac{0}{20} = \frac{85}{100}$ ,

where  $[i]n[/i]$  represents the number of fruit plants. We can solve this problem by multiplying both the numerator and denominator by the same number. We can see that  $20 \times 5 = 100$ , so  $[i]n[/i] \times 5 = 85$ . Now we need to find the value of  $[i]n[/i]$ . We know that  $17 \times 5 = 85$ , so  $[i]n[/i]$  must equal 17. We need to have 17 fruit plants in the garden. [b]Try this yourself: If you are planting a garden with 25 plants, and 72% need to be vegetables, how many vegetable plants do you need?[/b]



## PERCENTS VOCABULARY

### Ratio

A multiplicative comparison of two amounts.

### Multiplicative

Related to or based on multiplication.

### Part-part ratio

A ratio that compares the size of two parts from the same whole.

### Part-whole ratio

A ratio that compares the size of one part to the size of the whole. Fractions are a form of part-whole ratio.

### Numerator

In a part-whole ratio or in a fraction, the numerator represents the number of parts.

### Denominator

In a part-whole ratio or in a fraction, the denominator represents the number of parts the whole is partitioned into.

## PERCENTS DISCUSSION QUESTIONS

### What is a percent?

A percent is a special part-whole ratio where the whole is 100.

---

### What is 60% of 100? How do you know?

Percent means per 100, so 60 percent means 60 per 100. So 60% of 100 is 60.

---

### What is 60% of 50? How do you know?

I can answer this by reasoning about equivalent ratios. I know that 60% of 100 is 60. I also know that half of 100 is 50. To keep the ratios equivalent I need to multiply or divide both the numerator and denominator of my ratio by the same value. Since 50 is half of 100, and 30 is half of 60, 60% of 50 must be 30.

---

### What is 28% as a decimal?

I know that 28% means I have 28 out of 100. This also means I have 28 hundredths. I write 28 hundredths as 0.28, so 0.28 is the decimal value of 28%.

---

### You have stacked 20 logs so far. You are 80% of the way through stacking the wood pile. How many logs are in the whole pile?

First I need to set up an equation  $\frac{20}{x} = \frac{80}{100}$  and then use proportional reasoning. I know that  $20 \times 4 = 80$ , and to keep my ratios equivalent, I need to multiply the numerator and denominator by the same value. This means  $\frac{20 \times 4}{x \times 4} = \frac{80}{100}$ , so since  $20 \times 4 = 80$  there must be 25 logs in the whole pile.

---