

Using Decimals & Fractions as Percents

Percent means out of 100.

In math **“of”** means multiply.

To find the “percent of” a number:

- 1) Change the percent to a decimal and then multiply.
- 2) **OR** Turn the percent into a fraction and then multiply.

100% means 1 whole. Therefore 100% of 85 is 85. That's just like changing 100% to its equivalent decimal, 1, and multiplying by 85. If you have less than 100% of a number, the solution is less than the original number.

Example:

Find 75% of 36.

<p>OPTION 1 (Change the percent to a decimal)</p> $\begin{array}{r} .75 \\ \times 36 \\ \hline 450 \\ 2250 \\ \hline 27.00 \end{array}$	<p>OPTION 2 (Change the percent to a fraction)</p> $\frac{75}{100} \cdot \frac{36}{1} = \frac{3}{4} \cdot \frac{36}{1} = 27$
<p>Therefore, 75% of 36 is 27.</p>	

TIP: Always, always, always check your answer to see if it is reasonable. (Does it make sense?) 75% is less than 100% so 27 should be less than 36. 75% is greater than 50% so 27 should be greater than half of 36, which is 18. If those things are true, you are probably on the right track!

You Try:

For each problem below, circle the **ONLY** reasonable answer based on what you know.

Problem	Circle the ONLY reasonable answer			
90% of 40	9	36	17	57
25% of 72	18	54	2.5	70
50% of 1600	56	16	1650	800
110% of 55	1.5	115	60.5	25
5% of 80	58	4	804	85

Find the “percent of” for each of the problems below.

1) 50% of 12	2) 20% of 45	3) 15% of 100
4) 5% of 40	5) 150% of 92	6) 25% of 90
7) 100% of 183	8) Eddie's mystery number is 45% of 200. What is his mystery number?	
9) “Arachibutyrophobia” is the fear of peanut butter getting stuck to the roof of your mouth. In a survey of 150 people, 2% of them have arachibutyrophobia. How many people surveyed have this fear?		
10) When making peanut butter and jelly sandwiches, 20% of people put the peanut butter on first. Out of 75 people, how many people would NOT put peanut butter on first?		
11) At ECMS, about 25% of the 6 th graders made an A in math. If there are 416 6 th graders, how many made an A?		
12) Last year, ECMS had 1280 students. If we have 110% of that amount this year, how many students are at ECMS this year?		

Using a Table to Find Percents

Example:

There are 14 candies in a bag that is 20% full. How many candies are in a full bag?

USE A TABLE

Percentage	0%	20%	40%	60%	80%	100%
Part	0	14	28	42	56	70

You Try:

Use a table to solve the percent problems below.

1) 16 is 80% of what number?

Percentage		16	
Part	20%	80%	100%

2) Peyton made a 90% on her math test. If she got 27 questions correct, how many total questions were on the test?

Percentage			
Part			

3) 64% of the students in a classroom are girls. If there are 16 girls, how many total students are in the class?

Percentage			
Part			

The Percent Proportion

You can use a percent proportion to solve for any one piece when given the other 3.

$$\frac{\text{is}}{\text{of}} = \frac{\%}{100} \quad \text{or} \quad \frac{\text{part}}{\text{whole}} = \frac{\%}{100}$$

Example:

Finding a percent (part) of a number (whole):

What is 20% of 240?

First, set up your proportion:

$$\frac{x}{240} = \frac{20}{100}$$

Then solve by cross multiplying:

$$\frac{x}{240} = \frac{20}{100}$$

$$x \cdot 100 = 240 \cdot 20$$

$$x \cdot 100 = 4800$$

$$x = \frac{4800}{100}$$

$$x = 48$$

48 is 20% of 240.

Finding the whole given the percent (part):

60 is 75% of what number?

First, set up your proportion:

$$\frac{60}{x} = \frac{75}{100}$$

Then solve by cross multiplying:

$$\frac{60}{x} = \frac{75}{100}$$

$$60 \cdot 100 = x \cdot 75$$

$$6000 = x \cdot 75$$

$$x = \frac{6000}{75}$$

$$x = 80$$

60 is 75% of 80.

You Try:

Use one of the methods you have learned to solve the following problems.

1) What is 5% of 200?

2) 8 is 40% of what number?

3) What is 15% of 80?

4) 18 is 25% of what number?

5) What is 25% of 60?

6) 62 is 50% of what number?

7) Martha put 20% of her paycheck in the bank. If her paycheck was \$150, how much did she put in the bank?

a) Should your answer be **MORE** or **LESS** than \$150?

b) Solution = _____

c) Write your answer in a complete sentence:

8) Ethan got 90% of the problems correct on a quiz. If he got 27 problems correct, how many problems were on the quiz?

a) Should your answer be **MORE** or **LESS** than 27?

b) Solution = _____

c) Write your answer in a complete sentence:

9) Whitney bought a pair of jeans that cost \$25. If tax is 5%, how much will she pay for the jeans?

a) Should your answer be **MORE** or **LESS** than \$25?

b) Solution = _____

c) Write your answer in a complete sentence:

10) Ellis' bill at Red Lobster was \$18.50. If he gives his server a 20% tip, how much tip will he leave?

a) Should your answer be **MORE** or **LESS** than \$18.50?

b) Solution = _____

c) Write your answer in a complete sentence:

Using Decimals & Fractions as Percents

Percent means out of 100.

In math “**of**” means multiply.

To find the “percent of” a number:

- 1) Change the percent to a decimal and then multiply.
- 2) **OR** Turn the percent into a fraction and then multiply.

100% means 1 whole. Therefore 100% of 85 is 85. That's just like changing 100% to its equivalent decimal, 1, and multiplying by 85. If you have less than 100% of a number, the solution is less than the original number.

Example:

Find 75% of 36.

<p>OPTION 1 (Change the percent to a decimal)</p> $\begin{array}{r} .75 \\ \times 36 \\ \hline 450 \\ 2250 \\ \hline 27.00 \end{array}$	<p>OPTION 2 (Change the percent to a fraction)</p> $\frac{75}{100} \cdot \frac{36}{1} = \frac{3}{4} \cdot \frac{36}{1} = 27$
<p>Therefore, 75% of 36 is 27.</p>	

TIP: Always, always, always check your answer to see if it is reasonable. (Does it make sense?) 75% is less than 100% so 27 should be less than 36. 75% is greater than 50% so 27 should be greater than half of 36, which is 18. If those things are true, you are probably on the right track!

You Try:

For each problem below, circle the **ONLY** reasonable answer based on what you know.

Problem	Circle the ONLY reasonable answer			
90% of 40	9	36	17	57
25% of 72	18	54	2.5	70
50% of 1600	56	16	1650	800
110% of 55	1.5	115	60.5	25
5% of 80	58	4	804	85

Find the "percent of" for each of the problems below.

1) 50% of 12 6	2) 20% of 45 9	3) 15% of 100 15
4) 5% of 40 2	5) 150% of 92 138	6) 25% of 90 22.5
7) 100% of 183 183	8) Eddie's mystery number is 45% of 200. What is his mystery number? Eddie's Mystery Number is 90.	
9) "Arachibutyrophobia" is the fear of peanut butter getting stuck to the roof of your mouth. In a survey of 150 people, 2% of them have arachibutyrophobia. How many people surveyed have this fear? 3 people surveyed have Arachibutyrophobia.		
10) When making peanut butter and jelly sandwiches, 20% of people put the peanut butter on first. Out of 75 people, how many people would NOT put peanut butter on first? 60 people would NOT put peanut butter on first.		
11) At ECMS, about 25% of the 6 th graders made an A in math. If there are 416 6 th graders, how many made an A? 104 of the 6th graders made an A.		
12) Last year, ECMS had 1280 students. If we have 110% of that amount this year, how many students are at ECMS this year? ECMS has 1408 students this year.		

Using a Table to Find Percents

Example:

There are 14 candies in a bag that is 20% full. How many candies are in a full bag?

USE A TABLE

Percentage	0%	20%	40%	60%	80%	100%
Part	0	14	28	42	56	70

You Try:

Use a table to solve the percent problems below.

1) 16 is 80% of what number? **16 is 80% of 20.**

Percentage	4	16	20
Part	20%	80%	100%

2) Peyton made a 90% on her math test. If she got 27 questions correct, how many total questions were on the test? **There were 30 questions on the test.**

Percentage	3	27	30
Part	10	90	100

3) 64% of the students in a classroom are girls. If there are 16 girls, how many total students are in the class? **There are 25 students in the class.**

Percentage	1	16	25
Part	4	64	100

The Percent Proportion

You can use a percent proportion to solve for any one piece when given the other 3.

$$\frac{\text{is}}{\text{of}} = \frac{\%}{100} \quad \text{or} \quad \frac{\text{part}}{\text{whole}} = \frac{\%}{100}$$

Example:

Finding a percent (part) of a number (whole):

What is 20% of 240?

First, set up your proportion:

$$\frac{x}{240} = \frac{20}{100}$$

Then solve by cross multiplying:

$$\frac{x}{240} = \frac{20}{100}$$

$$x \cdot 100 = 240 \cdot 20$$

$$x \cdot 100 = 4800$$

$$x = \frac{4800}{100}$$

$$x = 48$$

48 is 20% of 240.

Finding the whole given the percent (part):

60 is 75% of what number?

First, set up your proportion:

$$\frac{60}{x} = \frac{75}{100}$$

Then solve by cross multiplying:

$$\frac{60}{x} = \frac{75}{100}$$

$$60 \cdot 100 = x \cdot 75$$

$$6000 = x \cdot 75$$

$$x = \frac{6000}{75}$$

$$x = 80$$

60 is 75% of 80.

You Try:

Use one of the methods you have learned to solve the following problems.

1) What is 5% of 200? **10**

2) 8 is 40% of what number?

20

3) What is 15% of 80? **12**

4) 18 is 25% of what number? 72	5) What is 25% of 60? 15	6) 62 is 50% of what number? 124
7) Martha put 20% of her paycheck in the bank. If her paycheck was \$150, how much did she put in the bank? a) Should your answer be MORE or LESS than \$150? b) Solution = \$30 c) Write your answer in a complete sentence: Martha will put \$30 in the bank.		
8) Ethan got 90% of the problems correct on a quiz. If he got 27 problems correct, how many problems were on the quiz? a) Should your answer be MORE or LESS than 27? b) Solution = 30 c) Write your answer in a complete sentence: There were 30 questions on the quiz.		
9) Whitney bought a pair of jeans that cost \$25. If tax is 5%, how much will she pay for the jeans? a) Should your answer be MORE or LESS than \$25? b) Solution = \$26.25 c) Write your answer in a complete sentence: Whitney will pay \$26.25 for the jeans with tax.		
10) Ellis' bill at Red Lobster was \$18.50. If he gives his server a 20% tip, how much tip will he leave? a) Should your answer be MORE or LESS than \$18.50? b) Solution = \$3.70 c) Write your answer in a complete sentence: Ellis will pay \$3.70 in tip.		

