

Topic Tutorials

POWERED BY *Alpha II*

Percents



Student Copy: Percents - Topic Tutorials

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What is a Percent?

Procedure

- 1) Express 5 hundredths as a percent.

$$5 \text{ hundredths} = 5\%$$

↑
Percent sign

Percent (%) means hundredths.
Write % in place of hundredths.

Answer: 5%

- 2) Express $3\frac{1}{2}$ hundredths as a percent.

$$3\frac{1}{2} \text{ hundredths} = 3\frac{1}{2}\%$$

Answer: $3\frac{1}{2}\%$

- 3) Express 19 out of 100 as a percent.

$$19 \text{ out of } 100 = 19 \text{ hundredths} = 19\%$$

Answer: 19%

- 4) How many hundredths are in 4.9%?

$$4.9\% = 4.9 \text{ hundredths}$$

Answer: 4.9 hundredths

- 5) Write 37 hundredths as a percent, as a decimal and as a fraction.

$$37 \text{ hundredths} = 37\%$$

$$37 \text{ hundredths} = .37$$

2 decimal places

$$37 \text{ hundredths} = \frac{37}{100}$$

Answer: 37%, .37, $\frac{37}{100}$

- 6) Write 100% as a decimal.
 100% = 100 hundredths

$$= \underset{\substack{\text{2 decimal places}}}{1.00} = 1$$

100% of anything is $\frac{100}{100}$ of it, or all of it.

Answer: 1

- 7) Write 83% as a ratio.

$$83\% = \frac{83}{100} \text{ or } 83:100$$

A percent may be considered as a ratio of a number to 100.

Answer: $\frac{83}{100}$ or 83:100

Examples:

- 1) Write 3 hundredths as a percent.

$$3 \text{ hundredths} = 3\%$$

Answer: 3%

- 2) Write 47 out of 100 as a percent.

$$47 \text{ out of } 100 = 47\%$$

Answer: 47%

- 3) How many hundredths are in 7%?

$$7\% = 7 \text{ hundredths}$$

Answer: 7

4) Write 23 hundredths as a percent, a decimal and a fraction.

$$23 \text{ hundredths} = 23\%$$

$$23 \text{ hundredths} = .23$$

$$23 \text{ hundredths} = \frac{23}{100}$$

Answer: 23%, .23, $\frac{23}{100}$

5) Write 18% as a ratio.

$$18\% = \frac{18}{100} \text{ or } 18:100$$

Answer: $\frac{18}{100}$ or 18:100

Try these:

- 1) Express eighteen hundredths as a percent.

- 2) Express 81 out of 100 as a percent.

- 3) How many hundredths are in 35%?

- 4) Write four hundredths as a percent, decimal and fraction.

- 5) Write 36% as a ratio.

- 6) Express forty-seven hundredths as a percent.

7) How many hundredths are in 83%

8) Express 69 out of 100 as a percent.

9) Write twenty-one hundredths as a percent, decimal and fraction.

10) Write 78% as a ratio.

Changing Decimals to Percents

This document will show a method for changing decimals to percents.

Follow the steps below.

Change .37 into a percent.

Step 1: Move the decimal point *two* places to the right.

$$.37 = 37.$$


Step 2: Write a percent sign.

$$37\%$$

If the decimal is a whole number, write two zeros before moving the decimal. Write a percent sign.

$$6 = 6.00 = 600\%$$


Remember to write in any needed zeros to fill out places when moving the decimal.

$$14.5 = 14.50 = 1450\%$$


Procedure

- 1) Write .07 as a percent.

$$.07 = \overset{\curvearrowright}{.07} = 7\%$$

2 decimal places

Copy the given numeral. Move the decimal point 2 places to the right and write a percent sign.

Answer: 7%

- 2) Write .19 as a percent.

$$.19 = \overset{\curvearrowright}{.19} = 19\%$$

Answer: 19%

- 3) Write 1.34 as a percent.

$$1.34 = \overset{\curvearrowright}{1.34} = 134\%$$

Answer: 134%

- 4) Write .5 as a percent.

$$.5 = \overset{\text{Write 1 zero.}}{\overset{\curvearrowright}{.50}} = 50\%$$

Answer: 50%

- 5) Write 8 as a percent.

$$8 = \overset{\text{Write 2 zeros.}}{\overset{\curvearrowright}{8.00}} = 800\%$$

Answer: 800%

- 6) Write 3.687 as a percent.

$$3.687 = \overset{\curvearrowright}{3.687} = 368.7\%$$

Answer: 368.7%

7) Write $.06\frac{1}{2}$ as a percent.

$$.06\frac{1}{2} = .06\frac{1}{2} = 6\frac{1}{2}\%$$

Answer: $6\frac{1}{2}\%$

8) Write $.00\frac{2}{5}$ as a percent.

$$.00\frac{2}{5} = .00\frac{2}{5} = \frac{2}{5}\%$$

Answer: $\frac{2}{5}\%$

9) Write $.4\frac{1}{2}$ as a percent.

$$.4\frac{1}{2} = .45 = 45\%$$

Change $\frac{1}{2}$ to a decimal .5

Answer: 45%

Try these:

Write each of the following decimals as a percent.

1) .04

2) $.05\frac{1}{2}$

3) $1.01\frac{1}{4}$

4) .51

5) $.40\frac{7}{8}$

6) 1.625

7) .9

8) .347

9) 7

10) 1.42

Finding the Percent of a Number

The method for finding the percent of a number is simple. Remember that the word **"of"** means to multiply.

For example: Find 32% of 78

Follow the steps below.

Step 1: Change the percent to a decimal.

$$32.\% = .32$$

Step 2: Multiply the other number in the problem by the decimal.

78	0 decimal places
<u>x .32</u>	+2 decimal places
156	2 total decimal places
+ 2340	
<u>24.96</u>	
	Move the decimal point two places left.

Step 3: Put the decimal point in the correct place in the product.

$$32\% \text{ of } 78 = 24.96$$

Procedure

- 1) Find 23% of 64.

$$23\% = .23$$

Rewrite the percent as a decimal.

Multiply the **given number** by the **decimal**.

$$\begin{array}{r} 64 \\ \times .23 \\ \hline 192 \\ 1280 \\ \hline 14.72 \\ \text{Answer: } 14.72 \end{array}$$

- 2) Find 3% of 18.

$$3\% = .03$$

$$\begin{array}{r} 18 \\ \times .03 \\ \hline 54 \\ 000 \\ \hline .54 \end{array}$$

Answer: .54

- 3) Find 114% of 240.

$$114\% = 1.14$$

$$\begin{array}{r} 240 \\ \times 1.14 \\ \hline 960 \\ 2400 \\ 24000 \\ \hline 273.60 \end{array}$$

Answer: 273.60 or 273.6

4) Find 4% of \$200.

$$4\% = \frac{4}{100}$$

$$\frac{4}{100} \times 200 = \frac{4}{\cancel{100}} \times \frac{200^2}{1} = 8$$

Sometimes it is easier to rewrite the percent as a fraction.

Answer: \$8

5) Find $3\frac{1}{2}\%$ of 40.

$$3\frac{1}{2}\% = .03\frac{1}{2} = .035$$

$$\begin{array}{r} .035 \\ \times 40 \\ \hline 000 \\ 1400 \\ \hline 1.400 = 1.4 \end{array}$$

Put the longer number on top even though it is the decimal.
It makes it easier to multiply.

Answer: 1.4

6) Find $\frac{3}{4}\%$ of 650.

$$\frac{3}{4}\% = .00\frac{3}{4} = .0075$$

$$\begin{array}{r} .0075 \\ \times 650 \\ \hline 0000 \\ 03750 \\ 045000 \\ \hline 4.8750 = 4.875 \end{array}$$

Answer: 4.875

7) Find .6% of 52.

$$.6\% = .006$$

$$\begin{array}{r} .006 \\ \times 52 \\ \hline 012 \\ 0300 \\ \hline 0.312 = .312 \end{array}$$

Answer: .312

8) Find 7% of \$12.96 to the nearest cent.

$$7\% = .07$$

$$\begin{array}{r} 12.96 \\ \times .07 \\ \hline 9072 \\ 00000 \\ \hline \end{array}$$

$$0.9072 = .9072 = .91$$

The nearest cent means two decimal place.

Answer: \$.91

9) Solve the equation: $15\% \text{ of } 35 = n$ Two find the value of n , multiply the given numbers.

$$15\% = .15$$

$$\begin{array}{r} 35 \\ \times .15 \\ \hline 175 \\ 350 \\ \hline 5.25 \end{array}$$

Answer: $n = 5.25$

Try These:

1) 94% of 36

2) 7.9% of 92.8

3) 25% of 6000

4) 130% of 400

5) $66\frac{2}{3}\%$ of 819

6) 143% of 750

7) 6.85% of 9000

8) .3% of \$2500

9) $4\frac{1}{2}\%$ of 8500

10) 16% of \$36.48 to the nearest cent.

Solving Word Problems with Percent

Read this problem. Follow the steps below to solve it.

Logan's Furniture Store was having a sale. Everything was 30% off the list price. Jed and Grace found a sofa they liked. Its list price was \$795. What would the sale price of the sofa be?

Step 1: Read the problem.

Step 2: Learn what you must find out.

- 1) How much is 30% of \$795?
- 2) What will the price be after this amount is subtracted from \$795?

Step 3: Notice the numbers. Which number is the whole?
What is the percent?

The **whole**: \$795 The **percent**: 30%

Step 4: Find out how much 30% of \$795 is.

$$\begin{array}{r}
 795 \\
 \times .30 \\
 \hline
 000 \\
 +23850 \\
 \hline
 238.50
 \end{array}$$

Step 5: Subtract that amount from \$795

$$\begin{array}{r}
 \$795.00 \\
 - \quad 238.50 \\
 \hline
 \$556.50
 \end{array}$$

Step 6: Check the answer. Ask yourself if it makes sense.

Procedure

- 1) Juan answered 31 questions correctly on a test of 40 questions.
What percent of the questions did he answer correctly?

Given Facts: Test contained 40 questions; 31 questions answered correctly.

Question Asked: What percent of the questions were answered correctly?

Operation Needed: *Finding what percent one number is of another number indicates division and changing the decimal quotient to a percent.*

Your Plan: The number of questions answered correctly divided by the total number of questions is equal to the decimal or fractional part of the test answered correctly. Express this quotient as a percent.

Equation: $31 \div 40 = N$ or $\frac{31}{40} = N$

Estimate the Answer: $31 \approx 30$
 $40 \approx 40$

$$\frac{30}{40} = \frac{3}{4} = .75 \text{ or } 75\%$$

Solution:

$$\begin{array}{r} .77 \frac{20}{40} \\ 40 \overline{) 31.00} \\ \underline{- 280} \\ 300 \\ \underline{- 280} \\ 20 \end{array}$$

$$.77 \frac{20}{40} = .77 \frac{2}{4} = .77 \frac{1}{2} = 77 \frac{1}{2} \%$$

Check the Accuracy: $40 \times .775 = 31$

Compare the answer to the estimate: The answer 77.5% compares reasonably well with the estimate of 75% because they are close.

2) Mr. Huang saves \$150 each month. If his annual income is \$18,000, what percent of his income does he save annually?

Given Facts: Saves \$150 each month. Annual income is \$18,000.

Question Asked: What percent of his income does he save annually?

Operation Needed: Finding what percent one number is of another indicated division, changing decimal quotients to a percent and multiplication to find how much he saves annually.

Plan: Find out how much he saves annually by multiplying his monthly amount by 12. Then divide his annual savings by his annual salary. Express this quotient as a percent.

Equation: $150 \times 12 \div 18000 = N$ or $\frac{1800}{18000} = N$

Estimate Answer: $\frac{1800}{18000} = \frac{1}{10} = 10\%$

Solution: $150 \times 12 = 1800$

$$\begin{array}{r} .10 \\ 18000 \overline{)1800.00} \\ \underline{- 18000} \\ 00 \\ \underline{- 0} \\ 0 \end{array}$$

.10 = 10%

Check Accuracy: $18,000 \times .10 = 1800$

Compare answer to estimate: the answer of 10% compares reasonably well to the estimate of 10% because they are the same.

3) Find the rate of reduction when a basketball that regularly sells for \$25 was purchased for \$20.

Given Facts: Regular price for ball: \$25, Sale price \$20.

Question Asked: What is the rate of reduction in price?

Operation Needed: Finding the rate of reduction is the same as finding what percent one number is of another number and this indicates division and changing a decimal quotient to a percent.

Plan: The sale price divided by the regular price equals the reduction rate.

Equation: $20 \div 25 = N$ or $\frac{20}{25} = N$

Estimate: $\frac{20}{25} = \frac{4}{5} = .80 = 80\%$

Solution:

$$\begin{array}{r} .80 \\ 25 \overline{)20.00} \\ \underline{-200} \\ 00 \\ \underline{-0} \\ 0 \end{array}$$

$.80 = 80\%$

Check: $25 \times .80 = 20$

Compare answer to estimate: The answer 80% compares reasonably well to the estimate of 80% because they are the same.

Try these:

4) How many problems did Joan have right if she received a grade of 85% in a mathematics test of 20 problems?

5) A factory has 258 workers. A total of 42% of them drive to work. How many workers at this factory drive to work?