

## Percent Change: Starting with 100 is Easy

CPC 1

**Instructions:** For each problem, calculate the difference between the original amount and the new amount. Then express that change as a percent change. Remember it's easy when you start with 100.

**Note:** See the Integer Arithmetic section if you need help with negative numbers.

	original	new	difference (change)	percent change
1	<u>100</u>	<u>105</u>	<u><math>105 - 100 = +5</math></u>	<u>5% increase</u>
2	<u>100</u>	<u>90</u>	<u><math>90 - 100 = -10</math></u>	<u>10% decrease</u>
3	<u>100</u>	<u>132</u>	<u><math>132 - 100 = +32</math></u>	<u>32% increase</u>
4	<u>100</u>	<u>170</u>	<u><math>170 - 100 = +70</math></u>	<u>70% increase</u>
5	<u>100</u>	<u>25</u>	<u><math>25 - 100 = -75</math></u>	<u>75% decrease</u>
6	<u>100</u>	<u>0</u>	<u><math>0 - 100 = -100</math></u>	<u>100% decrease</u>
7	<u>100</u>	<u>155</u>	<u><math>155 - 100 = +55</math></u>	<u>55% increase</u>
8	<u>100</u>	<u>10</u>	<u><math>10 - 100 = -90</math></u>	<u>90% decrease</u>
9	<u>100</u>	<u>200</u>	<u><math>200 - 100 = +100</math></u>	<u>100% increase</u>
10	<u>100</u>	<u>400</u>	<u><math>400 - 100 = +300</math></u>	<u>300% increase</u>

## The Percent Change Formula - Part 1

CPC 2

**Instructions:** The basic formula for percent change is shown below. Use it to solve these problems. You may want to use a calculator for the division. Round answers to a tenth of a percent if necessary.

$$\% \text{ change} = \frac{\text{change}}{\text{original}} \times 100$$

1 original: 20      % change =  $\frac{+5}{20} \times 100$   
 change: +5  
 $= 0.25 \times 100 = 25\% \text{ increase}$

2 original: 10      % change =  $\frac{-4}{10} \times 100$   
 change: -4  
 $= -0.4 \times 100 = 40\% \text{ decrease}$

3 original: 80      % change =  $\frac{+12}{80} \times 100$   
 change: +12  
 $= 0.15 \times 100 = 15\% \text{ increase}$

4 original: 9      % change =  $\frac{-2}{9} \times 100$   
 change: -2  
 $= -0.222 \times 100 = 22.2\% \text{ decrease}$

5 original: 250      % change =  $\frac{-50}{250} \times 100$   
 change: -50  
 $= -0.2 \times 100 = 20\% \text{ decrease}$

6 original: 15      % change =  $\frac{+45}{15} \times 100$   
 change: +45  
 $= 3.0 \times 100 = 300\% \text{ increase}$

## The Percent Change Formula - Part 2

CPC 3

**Instructions:** When you have to calculate the absolute change yourself, the formula for percent change gets just a little more complicated. Use this version of the formula to solve the problems below. You may want to use a calculator and round your answers to the nearest tenth of a percent.

$$\text{change} = \text{new} - \text{original} \quad \text{SO} \quad \% \text{ change} = \frac{\text{new} - \text{original}}{\text{original}} \times 100$$

**1** original: 30      new: 22

$$\begin{aligned} \% \text{ change} &= \frac{22 - 30}{30} \times 100 = \frac{-8}{30} \times 100 = -0.267 \times 100 \\ &= 26.7\% \text{ decrease} \end{aligned}$$

**2** original: 10      new: 18

$$\begin{aligned} \% \text{ change} &= \frac{18 - 10}{10} \times 100 = \frac{+8}{10} \times 100 = +0.8 \times 100 \\ &= 80\% \text{ increase} \end{aligned}$$

**3** original: 80      new: 60

$$\begin{aligned} \% \text{ change} &= \frac{60 - 80}{80} \times 100 = \frac{-20}{80} \times 100 = -0.250 \times 100 \\ &= 25\% \text{ decrease} \end{aligned}$$

**4** original: 64      new: 14

$$\begin{aligned} \% \text{ change} &= \frac{14 - 64}{64} \times 100 = \frac{-50}{64} \times 100 = -0.781 \times 100 \\ &= 78.1\% \text{ decrease} \end{aligned}$$

**5** original: 5      new: 18

$$\begin{aligned} \% \text{ change} &= \frac{18 - 5}{5} \times 100 = \frac{+13}{5} \times 100 = +2.6 \times 100 \\ &= 260\% \text{ increase} \end{aligned}$$

**6** original: 7      new: 12

$$\begin{aligned} \% \text{ change} &= \frac{12 - 7}{7} \times 100 = \frac{+5}{7} \times 100 = +0.714 \times 100 \\ &= 71.4\% \text{ increase} \end{aligned}$$

## Percent Change Word Problems - Set 1

CPC 4

**Instructions:** Use the percent change formula to solve these word problems. You may want to use a calculator for the division. Round answers to the nearest tenth of a percent.

- 1 An old light bulb uses 60 watts of power, but a new LED bulb uses only 9 watts. What is the percent change?

$$\begin{aligned} \text{change} &= 9 - 60 = -51 \\ \% \text{ change} &= \frac{-51}{60} \times 100 \\ &= -0.85 \times 100 \\ &= \text{-85\%} \end{aligned}$$

- 2 Rob did 15 push-ups on Monday, but on Tuesday he did 3 more than on Monday. What was the percent change?

$$\begin{aligned} \% \text{ change} &= \frac{+3}{15} \\ &= 0.2 \times 100 \\ &= \text{+20\%} \end{aligned}$$

- 3 If a dog weighs 42 lbs at the vet office, but then weighs 46 lbs at the next visit, what is the percent change in the dog's weight?

$$\begin{aligned} \text{change} &= 46 - 42 = +4 \\ \% \text{ change} &= \frac{+4}{42} \times 100 \\ &= 0.095 \times 100 \\ &= \text{+9.5\%} \end{aligned}$$

- 4 A hat you want to buy is on sale for \$16. The original price was \$25. What is the percent change in price?

$$\begin{aligned} \text{change} &= 16 - 25 = -9 \\ \% \text{ change} &= \frac{-9}{25} \times 100 \\ &= -0.36 \times 100 \\ &= \text{-36\%} \end{aligned}$$

- 5 A grocery store had 38 employees, but then they hired 4 more people. What is the percent change in their staff?

$$\begin{aligned} \% \text{ change} &= \frac{+4}{38} \times 100 \\ &= 0.105 \times 100 \\ &= \text{+10.5\%} \end{aligned}$$

- 6 At noon, the temperature was 77 degrees, but by midnight, it had dropped to 52 degrees. What percent change is that?

$$\begin{aligned} \text{change} &= 52 - 77 = -26 \\ \% \text{ change} &= \frac{-26}{77} \times 100 \\ &= -0.325 \times 100 \\ &= \text{-32.5\%} \end{aligned}$$

## Percent Change Word Problems - Set 2

CPC 5

**Instructions:** Use the percent change formula to solve these word problems. You may want to use a calculator for the division. Round answers to the nearest tenth of a percent.

- 1 Your school's drama club had 16 members, but then 2 more students joined the club. What was the percent change?

$$\begin{aligned} \text{\% change} &= \frac{+2}{16} \\ &= 0.125 \times 100 \\ &= \text{\textcircled{+12.5\%}} \end{aligned}$$

- 2 A pizzeria delivered 82 pizzas on Friday. On Saturday, they delivered 74 pizzas. What was the percent change from Friday to Saturday?

$$\begin{aligned} \text{change} &= 74 - 82 = -8 \\ \text{\% change} &= \frac{-8}{82} \times 100 \\ &= -0.098 \times 100 \\ &= \text{\textcircled{-9.8\%}} \end{aligned}$$

- 3 When Robby measured his height in January, it was 48 inches. But when he measured it again in December, it was 50 inches. What percent change is that?

$$\begin{aligned} \text{change} &= 50 - 48 = +2 \\ \text{\% change} &= \frac{+2}{48} \times 100 \\ &= 0.042 \times 100 \\ &= \text{\textcircled{+4.2\%}} \end{aligned}$$

- 4 A part-time employee who earns \$14 per hour, gets a raise of \$1 per hour. What percent change in pay is that?

$$\begin{aligned} \text{\% change} &= \frac{+1}{14} \times 100 \\ &= 0.071 \times 100 \\ &= \text{\textcircled{+7.1\%}} \end{aligned}$$

- 5 Your phone battery typically lasts 12 hours, but a new and improved phone battery typically lasts 15 hours. What percent change is that?

$$\begin{aligned} \text{change} &= 15 - 12 = +3 \\ \text{\% change} &= \frac{+3}{12} \times 100 \\ &= 0.25 \times 100 \\ &= \text{\textcircled{+25\%}} \end{aligned}$$

- 6 A surf shop sold 145 long boards in the Summer, but only 90 in the Fall. What percent change is that?

$$\begin{aligned} \text{change} &= 90 - 145 = -55 \\ \text{\% change} &= \frac{-55}{145} \times 100 \\ &= -0.379 \times 100 \\ &= \text{\textcircled{-37.9\%}} \end{aligned}$$

## Percent Change Word Problems - Set 3

CPC 6

**Instructions:** Use the percent change formula to solve these word problems. We recommend using a calculator for these problems. Round answers to the nearest tenth of a percent.

- 1 A meteorologist measures 3.7 inches of rain in April and 2.8 inches of rain in May. What was the percent change from April to May?

$$\begin{aligned} \text{change} &= 2.8 - 3.7 = -0.9 \\ \% \text{ change} &= \frac{-0.9}{3.7} \times 100 \\ &= -0.243 \times 100 \\ &= \textcircled{-24.3\%} \end{aligned}$$

- 2 A small town has a population of 2,650 residents. If 130 more people move to that town, what would the percent change be?

$$\begin{aligned} \% \text{ change} &= \frac{+130}{2650} \times 100 \\ &= 0.049 \times 100 \\ &= \textcircled{+4.9\%} \end{aligned}$$

- 3 A library loaned out 570 books one week and 485 books the next week. What was the percent change in books loaned out?

$$\begin{aligned} \text{change} &= 485 - 570 = -85 \\ \% \text{ change} &= \frac{-85}{570} \times 100 \\ &= -0.149 \times 100 \\ &= \textcircled{-14.9\%} \end{aligned}$$

- 4 If a person has saved up \$3,120 in their savings account, and then they deposit \$250 more into the account. What percent change is that?

$$\begin{aligned} \% \text{ change} &= \frac{+250}{3120} \times 100 \\ &= 0.080 \times 100 \\ &= \textcircled{+8\%} \end{aligned}$$

- 5 If a loaf of bread costs \$3.99 but then goes on sale for only \$2.49 what percent change is that?

$$\begin{aligned} \text{change} &= 2.49 - 3.99 = -1.50 \\ \% \text{ change} &= \frac{-1.50}{3.99} \times 100 \\ &= -0.376 \times 100 \\ &= \textcircled{-37.6\%} \end{aligned}$$

- 6 A commuter used to drive 23.5 miles per day. After changing jobs, they now drive 5.4 mile per day. What percent change is that?

$$\begin{aligned} \text{change} &= 5.4 - 23.5 = -18.1 \\ \% \text{ change} &= \frac{-18.1}{23.5} \times 100 \\ &= -0.770 \times 100 \\ &= \textcircled{-77\%} \end{aligned}$$