

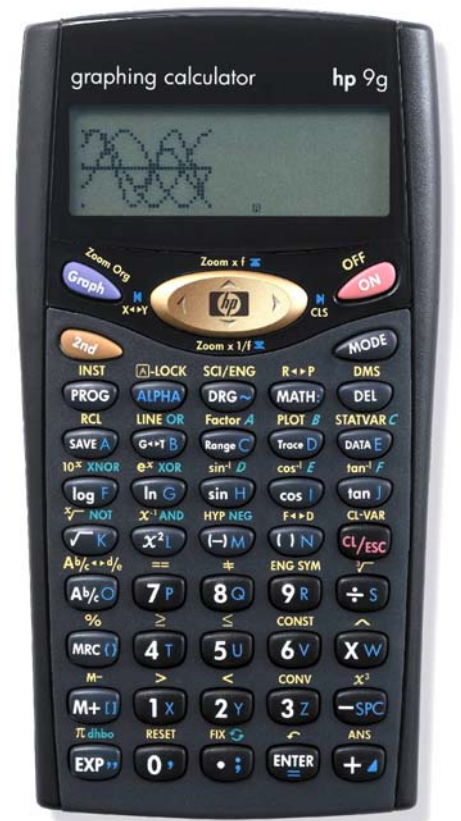


hp calculators

HP 9g Solving Problems Involving Percents

Percentages

Practice Working Problems Involving Percentages



Percentages

The percentage is defined as the number of parts for each hundred, and is usually abbreviated as *percent*. Its symbol is %. A percentage can also be thought as a fraction multiplied by 100. For example, 25 percent is written 25%, and is 0.25 (one quarter) multiplied by 100.

Percentages are used extensively in business, for example to specify bank rate, interest rates, tax rates, to get a mark-up or a discount price, etc. Percentages are also used outside business – scientific or engineering measurements, results, and uncertainties are stated as percentages.

The HP 9g provides the % key ($\overset{2nd}{\circlearrowleft} \%$) for use in calculating percentages.

Practice working problems involving percentages

Example 1: What is 18% of \$1,525.95?

Solution: In general, the n percent of an amount is obtained by multiplying this amount by the percentage n . In our case, we should press

$\overset{1X}{\circlearrowleft} \overset{5U}{\circlearrowleft} \overset{2Y}{\circlearrowleft} \overset{5U}{\circlearrowleft} \overset{\circ}{\circlearrowleft} \overset{9R}{\circlearrowleft} \overset{5U}{\circlearrowleft} \overset{XW}{\circlearrowleft} \overset{1X}{\circlearrowleft} \overset{8O}{\circlearrowleft} \overset{2nd}{\circlearrowleft} \%$

This displays the calculation $1525.95 \times 18\%$. Press $\overset{ENTER}{\circlearrowleft}$ to find the result. It is important to note that on the HP 9g “ $x\%$ ” is mathematically equivalent to “ x divided by 100”, so we can also solve this problem by pressing

$\overset{1X}{\circlearrowleft} \overset{8O}{\circlearrowleft} \overset{2nd}{\circlearrowleft} \% \overset{1X}{\circlearrowleft} \overset{5U}{\circlearrowleft} \overset{2Y}{\circlearrowleft} \overset{5U}{\circlearrowleft} \overset{\circ}{\circlearrowleft} \overset{9R}{\circlearrowleft} \overset{6Y}{\circlearrowleft} \overset{ENTER}{\circlearrowleft}$

Notice the implicit multiplication after the % symbol.

Answer: 274.67 when written to the nearest cent.

Example 2: What is 18% added to \$1,525.95?

Solution: On the HP 9g, n percent *added to* a number is calculated by multiplying this number by $(1 + n\%)$. Please note that this method differs from the way other calculators work. In this example, we can press

$\overset{+}{\circlearrowleft} \overset{1X}{\circlearrowleft} \overset{5U}{\circlearrowleft} \overset{2Y}{\circlearrowleft} \overset{5U}{\circlearrowleft} \overset{\circ}{\circlearrowleft} \overset{9R}{\circlearrowleft} \overset{5U}{\circlearrowleft} \overset{ENTER}{\circlearrowleft}$

since Ans contains the 18% already. In general, though, we will have to repeat the calculation by pressing

$\overset{1X}{\circlearrowleft} \overset{5U}{\circlearrowleft} \overset{2Y}{\circlearrowleft} \overset{5U}{\circlearrowleft} \overset{\circ}{\circlearrowleft} \overset{9R}{\circlearrowleft} \overset{5U}{\circlearrowleft} \overset{(N)}{\circlearrowleft} \overset{1X}{\circlearrowleft} \overset{+}{\circlearrowleft} \overset{1X}{\circlearrowleft} \overset{8O}{\circlearrowleft} \overset{2nd}{\circlearrowleft} \% \overset{ENTER}{\circlearrowleft}$

Alternatively, we can store the number in Ans first and do the calculation $\text{Ans} + n\% \times \text{Ans}$. In fact, you don't need to press the first Ans since it is automatically inserted into the entry line when pressing $\overset{+}{\circlearrowleft}$, and the \times signs is not necessary either since the multiplication can be implicitly stated after the % symbol. Therefore, we can press

$\overset{1X}{\circlearrowleft} \overset{5U}{\circlearrowleft} \overset{2Y}{\circlearrowleft} \overset{5U}{\circlearrowleft} \overset{\circ}{\circlearrowleft} \overset{9R}{\circlearrowleft} \overset{5U}{\circlearrowleft} \overset{ENTER}{\circlearrowleft} \overset{+}{\circlearrowleft} \overset{1X}{\circlearrowleft} \overset{8O}{\circlearrowleft} \overset{2nd}{\circlearrowleft} \% \overset{2nd}{\circlearrowleft} \overset{ANS}{\circlearrowleft} \overset{ENTER}{\circlearrowleft}$

HP 9g Solving Problems Involving Percents

Answer: 1,800.62 when written to the nearest cent.

Example 3: The local grocery store is offering 8% off all tinned foods this week. What will be the cost of buying 5 tins that normally cost \$1.85 each?

Solution: We will use the last method used in example 2. The only difference is that we have to subtract the percentage instead of adding it:

$(1X) (\cdot) (8C) (5U) (XW) (5U) (ENTER) (-) (SPC) (8C) (2nd) (\%) (2nd) (ANS) (ENTER)$

Answer: 8% subtracted from 5 times \$1.85 gives a price of \$8.51 for the 5 tins.

Example 4: Calculate the number that is 10% greater than 25

Solution: $(2Y) (5U) (ENTER) (+) (1X) (0) (2nd) (\%) (2nd) (ANS) (ENTER)$

Answer: 27.5

Example 5: Just before Christmas, Jordy's fish shop marked up its lobster, which had a wholesale cost of \$15 per pound, by 40 percent. After Christmas, they marked the lobster down by 11 percent from the regular selling price, for a special sale. What was the sale price of this product?

Solution: We will link two percent calculations this time:

$(1X) (5U) (ENTER) (+) (4T) (0) (2nd) (\%) (2nd) (ANS) (ENTER) (-) (SPC) (1X) (1X) (2nd) (\%) (2nd) (ANS) (ENTER)$

Answer: \$18.69 per pound.

Example 6: To make a profit of 30%, what is the percentage of markup?

Solution: To find the markup percent M for a given gross profit G, we can use this formula:

$$M = \frac{100G}{100 - G}$$

$(1X) (0) (0) (XW) (3Z) (0) (\div) (N) (1X) (0) (0) (-) (SPC) (3Z) (0) (ENTER)$

Answer: 42.86 % when rounded to two decimal digits.

Example 7: If we add 30% to our cost price, what percent of the selling price will be the profit?

Solution: If M% is added to the cost price, the profit will be G% of the selling price:

$$G = \frac{100M}{M + 100}$$

$(1X) (0) (0) (XW) (3Z) (0) (\div) (N) (3Z) (0) (+) (1X) (0) (0) (ENTER)$

HP 9g Solving Problems Involving Percents

Answer: 23.08 % when rounded to two decimal digits.

Example 8: An investor has \$2,804 and \$25,755 in two market-tracking investment portfolios. The market gains 0.7% overnight. What is the new total value of the investor's portfolios?

Solution: The original total value is first calculated by adding the value of the two investments. Then 0.7 % is calculated as in example 2:

$(2Y) (80) (0) (4T) (+) (2Y) (5U) (7P) (5U) (5U) (ENTER) (+) (.) (7P) (2nd) (\%) (2nd) (ANS) (ENTER)$

Answer: The investor's portfolios are worth \$28,758.91 this morning.

Example 9: The investor in example 8 finds that when the market closes in the afternoon, the investment is worth \$28,701. By how much did the market change during the day?

Solution: On the HP 9g, there is no specific key or function for calculating percent changes, but they can be easily calculated using the following formula. To find the percent change between two numbers, use:

$$C = \frac{N - V}{V} 100$$

where C is the percent change, N is the new value and V is the original value. Since V is already in ANS from the previous example, press

$(ON) (2Y) (80) (7P) (0) (1X) (\div S) (-SPC) (2nd) (ANS) (\rightarrow) (XW) (EXP) (2Y) (\div S) (2nd) (ANS) (ENTER)$

Answer: The market changed by -0.20 during the day, in other words it fell by 0.2%.

Example 10: Find the percent of increase of your rent 15 years ago (\$75 per month) to today (\$320 per month).

Solution: This is another percent change calculation, which we'll solve using the above formula:

$(ON) (7P) (5U) (-SPC) (3Z) (2Y) (0) (\rightarrow) (\div S) (7P) (5U) (XW) (1X) (0) (0) (ENTER)$

Answer: The percent increase is 326.67%. Notice that the result is again negative because the change is calculated as a percentage of the first number, N.

Example 11: If 27 out of 1300 units fail a test, what percentage failed?

Solution: What we must calculate is the percent of total. If the partial value is P and the total is T then the percent total %T is:

$$\%T = \frac{P}{T} 100$$

$(2Y) (7P) (EXP) (2Y) (\div S) (1X) (3Z) (0) (0) (ENTER)$

HP 9g Solving Problems Involving Percents

Answer: 2.08% failed the test

Example 12: Total assets for Hydroid Company are \$1,675,840. The firm has inventories of \$234,578. What percentage of total assets is inventory?

Solution: $\text{2Y } \text{3Z } \text{4T } \text{5U } \text{7P } \text{8O } \text{EXP} \text{2Y } \text{+S } \text{1X } \text{6V } \text{7P } \text{5U } \text{8O } \text{4T } \text{0, } \text{ENTER}$

Answer: 14%

Example 13: Last year, Hydroid Company incurred salary expenses that were 45% of operating expenses. If operating expenses were \$76,349, what were salary expenses?

Solution: Salary expenses (P) are the operating expenses (T) multiplied by 45% and divided by 100:

$\text{7P } \text{6V } \text{3Z } \text{4T } \text{9R } \text{XW } \text{4T } \text{5U } \text{EXP} \text{M} \text{2Y } \text{ENTER}$

Answer: \$34,357.05

Example 14: You borrow \$1,250 from a relative, and agree to repay the loan in a year with 7% simple interest. How much money will you owe?

Solution: The total amount is the result of adding the loan to the interest of the loan.

$\text{1X } \text{2Y } \text{5U } \text{0, } \text{ENTER} \text{+} \text{7P } \text{2nd } \% \text{2nd } \text{ANS } \text{ENTER}$

Answer: \$1,337.50 is the amount that you must repay at the end of one year.

Example 15: The profit on a \$895 sale is $23\frac{7}{8}\%$. Calculate how much Craig will receive from the sale if his share on the profit is $17\frac{2}{3}\%$.

Solution: To find the profit, press

$\text{8O } \text{9R } \text{5U } \text{XW } \text{()N } \text{2Y } \text{3Z } \text{AB} \text{O } \text{7P } \text{AB} \text{O } \text{8O } \text{2nd } \% \text{ENTER}$

Craig's share is calculated by pressing:

$\text{XW } \text{()N } \text{1X } \text{7P } \text{AB} \text{O } \text{2Y } \text{AB} \text{O } \text{3Z } \text{2nd } \% \text{ENTER}$

Since the percent function has priority over fractions, these have to be enclosed inside parenthesis.

Answer: Craig's share of the total profit is \$37.75