

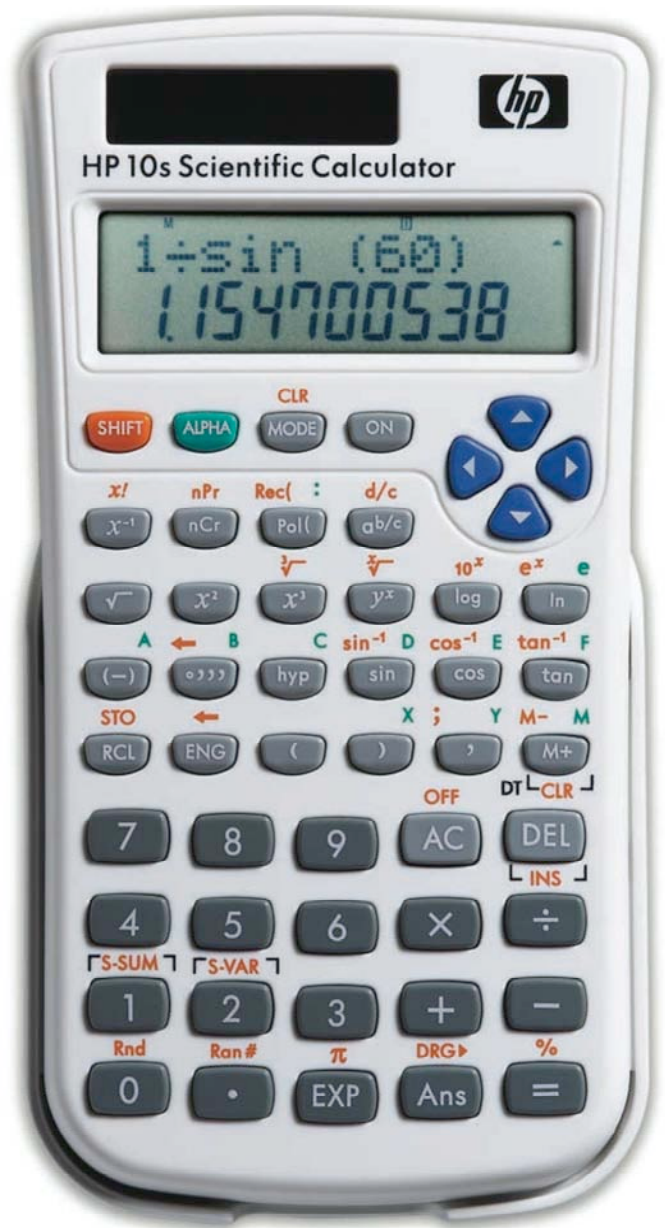


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HP 10s Solving Problems Involving Percents

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 the business world – scientific or engineering measurements, results, and uncertainties are stated as percentages.

Practice working problems involving percentages

Example 1: What is 18% of \$1,525.95? And 25% of \$1,525.95?

Solution: In general, the n percent **of** an amount is obtained by *multiplying* this amount by the percent n . In our case, the first calculation is $1525.95 \times 18\%$:

1 5 2 5 . 9 5 × 1 8 $\text{\textcircled{SHIFT}}$ % =

Note that in this example “ $x\%$ ” is mathematically equivalent to “ x divided by 100.” So, we can also solve this problem by pressing:

1 8 $\text{\textcircled{SHIFT}}$ % × 1 5 2 5 . 9 5 =

Answer: The percents are 274.67 and 381.49 when written to the nearest cent.

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

Solution: In general, n percent **added** to a number can be calculated by multiplying this number by $(1 + n\%)$. But, the HP 10s provides a shortcut: simply *add* the given amount to its $n\%$:

1 5 2 5 . 9 5 + 1 8 $\text{\textcircled{SHIFT}}$ % =

When the % key is pressed, the 18% of 1525.95 is displayed. Then, the $\text{\textcircled{=}}$ key carries out the addition.

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 method used in Example 2. The only difference is that we have to subtract the percentage instead of adding it:

1 . 8 5 × 5 = - 8 $\text{\textcircled{SHIFT}}$ % =

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

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

Solution: $25 + 10\% =$

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%. After Christmas, they have marked the lobster down by 11% for a special sale. What is the sale price of this product?

Solution: We will link two percent calculations this time:

$15 + 40\% = - 11\% =$

Answer: \$18.69 per pound.

Example 6: 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:

$2804 + 25755 = + \cdot 0.7\% =$

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

Example 7: 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 can solve using the above formula:

$320 - 75 = \div 75 \times 100 =$

but, using the $\overline{\Delta}\%$ key is a bit faster, though:

$320 - 75 = \div 75 \overline{\Delta}\% =$

Answer: The percent increase is 326.67%. Note that the result is again negative because the change is calculated as a percentage of the former rent, i.e. $N = 75$.

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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:

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

$\boxed{2} \boxed{7} \boxed{\div} \boxed{1} \boxed{3} \boxed{0} \boxed{0} \boxed{\text{LDTJ}} \boxed{\text{Ú}} \boxed{}$ (or $\boxed{2} \boxed{7} \boxed{\div} \boxed{1} \boxed{3} \boxed{0} \boxed{0} \boxed{\times} \boxed{1} \boxed{0} \boxed{0} \boxed{}$).

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: $\boxed{2} \boxed{3} \boxed{4} \boxed{5} \boxed{7} \boxed{8} \boxed{\div} \boxed{1} \boxed{6} \boxed{7} \boxed{5} \boxed{8} \boxed{4} \boxed{0} \boxed{\text{LDTJ}} \boxed{\text{Ú}} \boxed{}$

Answer: 14.00 %

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:

$\boxed{7} \boxed{6} \boxed{3} \boxed{4} \boxed{9} \boxed{\times} \boxed{4} \boxed{5} \boxed{\div} \boxed{1} \boxed{0} \boxed{0} \boxed{}$ or this shorter alternative:
 $\boxed{7} \boxed{6} \boxed{3} \boxed{4} \boxed{9} \boxed{\times} \boxed{4} \boxed{5} \boxed{\text{LDTJ}} \boxed{\text{Ú}} \boxed{}$

Answer: \$34,357.05

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

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

$\boxed{1} \boxed{2} \boxed{5} \boxed{0} \boxed{+} \boxed{7} \boxed{\text{LDTJ}} \boxed{\text{Ú}} \boxed{}$

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

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

Solution: To find the profit, press:

$\boxed{8} \boxed{9} \boxed{5} \boxed{\times} \boxed{2} \boxed{3} \boxed{\text{M+}} \boxed{7} \boxed{\text{M+}} \boxed{8} \boxed{\text{LDTJ}} \boxed{\text{Ú}} \boxed{}$

Gene's share is calculated by pressing:

$\boxed{\times} \boxed{1} \boxed{7} \boxed{\text{M+}} \boxed{2} \boxed{\text{M+}} \boxed{3} \boxed{\text{LDTJ}} \boxed{\text{Ú}} \boxed{}$

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