



Concept: Problems Involving Percent


Name: _____

COMPUTER COMPONENT

Instructions: In  follow the **Content Menu** path:
Percent > Problems Involving Percent

 Work through all Sub Lessons of the following Lessons **in order**:

- *In This Topic*
- *Steps in Solving Problems*
- *Finding the Whole*
- *Finding the Percent*
- *Percent of a Number*
- *Percents Greater than 100%*
- *Percents Less than 1%*
- *Mental Calculation*
- *Percent Change*

 As you work through the computer exercises, you will be prompted to make notes in your notebook/math journal.

NOTES:

1. Complete the following steps in problem solving

STEP 1: *Think about the problem*

STEP 2: *Think of a strategy.*

STEP 3: *Start.*

STEP 4: *Check your logic.*

2. Indicate in which step you would do the following:

	STEP #
Work out your strategy.	3
Decide what are information you are given.	1
Check your solution.	4
Plan your steps for a solution.	1
Find an answer.	3

Evaluate your answer to see if it is reasonable.	4
Figure out what you must find.	1
Re-solve the problem if necessary.	4
Write all the information down clearly.	1
Recheck your strategy.	2
Determine how you can use the given information.	1
Learn from your mistakes.	4

3. We can solve percent problems in a variety of ways (*strategies*).

Method 1 (*Writing a proportion of what we know*)

*Remember: A **proportion** is a relationship between two equal ratios.*

In percent problems, the two equals are usually

$$\frac{\text{percent}}{100} = \frac{\text{part}}{\text{whole}}$$

Example - Using Proportion: (*Fill in the missing parts*)

Bob bought a skateboard for \$50. The board was on sale for 25% of the regular price.
What was the regular price?

\$50 is 25% of the regular price

Simplify

$$\frac{25 \div 25}{100 \div 25} = \frac{1}{4}$$

$$\frac{25}{100} = \frac{50}{\text{regular}(price)}$$

$$\frac{1}{4} = \frac{50}{\text{regularprice}}$$

$$4 \times \text{regular price} = 4 \times 50$$

$$\text{regular price} = \$200$$

Method 2 (*Finding 1% then calculation 100%*)

 Example: (*Fill in the missing parts*)

Bob bought a skateboard for \$50. The board was on sale for 25% of the regular price.
 What was the regular price?

$$\begin{aligned}
 25\% \text{ of the regular price is} & \quad \$50 \\
 1\% \text{ of the regular price} & \quad = \quad \frac{50}{25} = 2 \\
 100\% \text{ of the regular price} & \quad = \quad 2 \times 100 \\
 \text{regular price} & \quad = \quad \$200
 \end{aligned}$$

Practice: Solve the following question using both methods.

When Brady was 15 years old, he weighed 92% of his present weight. Back then he weighed 115 pounds. *How much does he weigh now?*

Method 1 (Proportion)

115 pounds is 92% of his weight now.

$$\frac{92}{100} = \frac{115}{\text{Weight}(current)}$$

$$\frac{23}{25} = \frac{115}{\text{Weight}(current)}$$

$$5 \times \text{his weight now} = 5 \times 25$$

$$\text{his weight now} = \mathbf{125 \text{ pounds}}$$

Method 2

92% of his weight now is 115 pounds

$$1\% \text{ of his weight now} = \frac{115}{92} = 1.25$$

$$100\% \text{ of his weight now} = 100 \times 1.25$$

$$\text{his weight now} = \mathbf{125 \text{ pounds}}$$

Finding the Percent of a Number

Remember: Change the percent to a decimal and multiply. 10% of $70 = 0.10 \times 70$

A metal bar weighs 8.1 ounces. 40% of the bar is silver. How many ounces of silver are in the bar?

$$\text{Percent of the whole} = \% \times \text{whole}$$

$$40\% \text{ of } 8.1 = 0.4 \times 8.1$$

$$= 3.24 \text{ ounces}$$

Fill in the blanks for the following formulas.

$$\text{Percent Increased} = \frac{\text{Amount Increased}}{\text{Original Number}} \times 100 \%$$

$$\text{Percent decreased} = \frac{\text{Amount Decreased}}{\text{Original Number}} \times 100 \%$$

$$\text{Percent Markup} = \frac{\text{Price Difference}}{\text{Wholesale Price}} \times 100 \%$$

OFF COMPUTER EXERCISES

Solve the following:

- Bobby bought a stereo system for \$650, which was 70% of the regular price. *How much did the stereo cost originally?*

Let x represent the original price.

$$\frac{\text{sale}}{\text{original}} = \frac{70}{100} = \frac{\$650}{x} \quad x = \$928.57$$

The stereo originally cost \$928.57

2. In a school population of 1100 students, 15% of the males and 11% of the females will become doctors. *How many males and how many females will become doctors?*

Potential Male Doctors

= 15% of 1100

= 0.15×1100

= 165 male doctors

Potential Female Doctors

= 11% of 1100

= 0.11×1100

= 121 female doctor

Interesting fact: In 2000, an absentee bidder at a Boston auction paid a whopping \$11,500 for a 1954 Superman lunch box and thermos.

3. Kellie buys her lunch each day. She spends \$45 each week on lunches. She earns \$75 each week at her part-time job. *What percent of her earnings does she spend on lunches? Do you think she should pack her own lunch? Why or why not?*

$$\frac{\$lunch}{\$pay} = \frac{45}{75} = \frac{x}{100}$$

Kellie spends 60% of her pay on lunches.

4. At a factory that has 125 employees, 40% of the people that work there walk to work. *How many of their people walk to work?*

$$\frac{walk}{all} = \frac{40}{100} = \frac{x}{125}$$

$$x = 50$$

50 employees walk to work

5. Throughout the last two years, the school has been keeping track of the number of detentions. Today, the principal announced that the number of detentions to date has decreased from last year's 56 to 42.



What is the percent decrease?

Let x represent the number of students in detention.

$$\frac{decrease}{total} = \frac{14}{56} = \frac{x}{56}$$

$$x = 25$$

There was a decrease of 25%

Pencil trivia – A pencil will write in zero gravity, upside down, and under water!

6. Miss Smith ordered 500 pencils for her school. The pencil company sent her 120% of what she ordered. *How many pencils did Miss Smith's school receive?*

Let x represent the number of pencils.

$$\frac{\text{sent}}{\text{ordered}} = \frac{x}{500} = \frac{120}{100}$$

$$x = 600$$

Miss Smith received 600 pencils.

7. After a 200 km trip, you have travelled 65% of the way. *How far are you travelling?*

Let x represent the distance you are traveling.

$$\frac{\text{distance}}{\text{total}} = \frac{200}{x} = \frac{65}{100}$$

$$x = 308$$

You will travel 308 km in total.

8. At a tire factory, 0.5% of the tires are rejected because of abnormalities. The factory manufactures 1800 tires per day. *How many tires are rejected each day?*

Let x represent the number of rejected tires.

$$\frac{\text{rejected}}{\text{total}} = \frac{x}{1800} = \frac{0.5}{100}$$

$$x = 9$$

9. One year, the population of whales was 85. By the next year, it had risen to 140% of the original population. *How many whales are there now?*

Let x represent the number of whales present.

$$\frac{\text{now}}{\text{before}} = \frac{x}{85} = \frac{140}{100}$$

$$x = 119$$

There are now 119 whales in the population.

Challenges:

10. A survey of 128 students from four classes on their favorite sporting activity indicated the following:

Favorite Sport
In Which You Participate

Sport	Number of Students
Soccer	33
Football	9
Gymnastics	18
Baseball	40
Hockey	

Jamie misplaced the results for hockey and estimates that 50% of the students favored hockey. Bill estimates that 25% of the students indicated hockey.

Using the benchmarks of 10%, 25%, 75% or 100%, justify which estimate is more appropriate.

Jamie's estimate = 50% of 128 = $0.50 \times 128 = 64$

This is not possible because there are already 100 students accounted for above. $100 + 64 = 164$. This total would far exceed the 128 students surveyed.

Bill's estimate = 25% of 128 = $0.25 \times 128 = 32$

This is more realistic as $32 + 100 = 132$, which is much closer to the 128 students surveyed.

11. A store is able to buy a much sought after baby doll. The store purchase agent was able to get the doll from a distributor for a certain price. The store then raised the price they paid 60% and put a price tag on the doll. Then they had a store wide sale advertising 15% off everything in the store. If a customer pays \$47.60 for the baby doll, what was the price the store paid the distributor? (There was no sales tax.)

The store paid the distributor $\$X$

Store raised the price to $\$(X + .6X) = \$1.6X$

Customer paid above price less discount.

Ie .. $\$(1.6X - .15(1.6X)) = \47.60

$1.6X(1 - .15) = \$47.60$

$X = \$35$

The store paid \$35.