4.5 Solving Percent Problems Using Decimals

YOU WILL NEED

- a calculator

GOAL

Use the decimal representation of a percent to solve a problem.

LEARN ABOUT the Math

In Canada, more and more people are living in towns and cities. In January 2007, about 13.5% of Saskatchewan's population of 987 939 was Aboriginal. About 46.7% of the Aboriginal people were living in towns and cities.

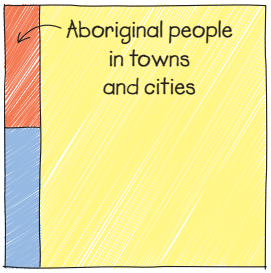
? About how many Aboriginal people in Saskatchewan live in towns and cities?

Example 1 | Using simpler decimals to estimate

The question said "about", so I decided to estimate.

Angèle's Solution

Saskatchewan's population



I drew a diagram to help me figure out what to do.

I realized I had to calculate 46.7% of 13.5% of 987 939.

13.5% is close to 10%
46.7% is close to 50%

I estimated 13.5% as 10%.
Since I rounded 13.5% down, I rounded 46.7% up to 50% to estimate.

10% of 50% = 0.1 x 0.5
= 0.05
987 939 is close to 1 000 000
0.05 x 1 000 000 = 50 000
About 50 000 Aboriginal people in Saskatchewan live in towns and cities.

I needed 50% of 10%, so I multiplied equivalent decimals.
Then I multiplied by an estimate of the population. I used 1 million for that estimate.

Reflecting

A. Why could you not have just calculated 46.7% of 1 000 000 directly to solve the problem?

B. Angèle rewrote the percents as decimals to solve the problem. How else could you have solved the problem?

WORK WITH the Math

Example 2 | Solving a problem using decimal division

Online sales in Canada in 2006 were 139.8% of online sales in 2005. The value of the sales in 2006 was $49.98 billion. What was the value of the sales in 2005?

Solution

$139.8\% = 1.398$	Write 139.8% as a decimal.
$1.398 \times 2005 \text{ sales} = 2006 \text{ sales}$ $1.398 \times 2005 \text{ sales} = \$49.98 \text{ billion}$	Write the equation relating the sales for 2005 and 2006.
Divide both sides by 1.398.	
$2005 \text{ sales} = \$49.98 \text{ billion} \div 1.398$ $= \$35.75 \text{ billion}$	Use a calculator to do the division.
Sales in 2005 were $35.75 billion.	

A Checking

1. Write equations involving decimals you could use to solve each, then solve them.

a) 15.2% of 35 = ■

b) 124% of 18 = ■

c) 5.5% of ■ = 40

d) 160% of ■ = 30

2. In November, the number of hits on the school blog rose to 112% of the number in October. There were 500 visitors to the blog in October. How many hits were there in November?

October: 500 hits on the school blog

November: 112% of the number of October hits

B Practising

3. Solve each by using a decimal equivalent for the percent.

a) 1.4% of 500 = ■
b) 0.45% of 250 = ■
c) 560 = 350% of ■
d) 24 = 0.8% of ■

4. What percent question is Ellen solving when she performs each computation? For example, a question for the calculation 40 ÷ 0.2 could be, "40 is 20% of a number. What is the number?"

a) 0.45 × 36
b) 1.2 × 45
c) 0.004 × 180
d) 56 ÷ 0.07
e) 36 ÷ 1.8
f) 90 ÷ 0.005

5. The cost of an item in Alberta is 105% of the listed price to include the GST. What is the cost of each of these items with tax included?

a) 

b) 

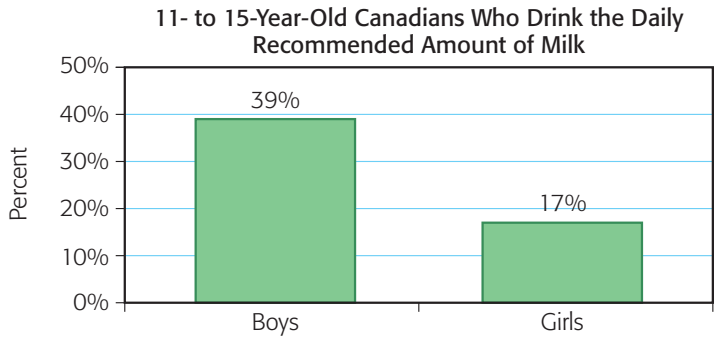
c) 

6. Jeff's parents bought new flooring for his room. There was a sale so they only had to pay 80% of the regular cost. If they paid $400, what was the regular price?

7. The chart below shows the most popular computer screen resolutions in Canada in 2007.
In a school where 400 students had computers, about how many would be using a screen resolution of 800 × 600?

Screen resolution	Percent of users
1024 × 768	54.31%
800 × 600	19.94%
1280 × 1024	12.06%
1280 × 800	3.93%
1152 × 864	3.75%

8. Refer to the graph. In a school with 480 boys aged 11 to 15, how many boys drink the amount of milk they should?



9. It is predicted that Aboriginal people will make up 32.5% of Saskatchewan's population in 2045. They made up 13.3% of the population in 1995. Why is the population increase not $32.5\% - 13.3\% = 19.2\%$ of the 2045 population?

10. The population of China is divided into 56 different ethnic groups. The population of the Han group is 90.56% of the Chinese population. Among the 55 other groups, the Dai people has the least population, which is 1.12% of the population of those 55 other groups. If the Chinese population is 1.6 billion, what is the Dai population?

11. Manuel is saving for a new mountain bike that costs 212% of the amount currently in his savings bank. The bike costs $349. How much has he saved?

12. In a survey, 365 girls and 345 boys in Grade 8 were asked, "What is your favourite weekend activity?" 7.4% girls and 10.1% boys chose watching TV and videos. How many more boys than girls chose this activity?

13. Describe a percent question you would solve using each of these calculations:

a) 1.25×400 **b)** $400 \div 1.25$ **c)** 0.035×400