

## 4.4 Combining Percents

Pg 148 Q# 4-6, 9-11, 13, 14

## Show You Know

What is the final sale price at each store? Which is a better buy? Explain your thinking.

Store A: 50% off one day only

Store B: 25% off one day followed by 25% off the reduced price the second day

## Key Ideas

- Percents can be combined by adding to solve problems.  $5\% + 7\% = 12\%$
- To calculate the increase in a number,
  - You can add the combined percent amount to the original number.  
 $12\%$  of  $100 = 0.12 \times 100 = 12$   
 $100 + 12 = 112$
  - You can multiply the original number by a single percent greater than 100.  
 $112\%$  of  $100 = 1.12 \times 100 = 112$
- Percents of percents can be used to determine amounts that result from consecutive percent increases or decreases.

## Communicate the Ideas

1. Draw a diagram to show how you could represent the cost of a \$100 item with and without tax.
2. Your friend shows you how to calculate the cost of an item including tax using several steps. You tell her that you can do the calculation in one step. Show how you would do this.
3. Kyle says that a population increase of 15% one year followed by an increase of 10% the next year is the same as a population increase of 25% over two years. Is Kyle correct? Explain your reasoning.

## Check Your Understanding

### Practise

For help with #4 and #5, refer to Example 1 on pages 145–146.

4. Chris purchased the following items:
  - 2 binders at \$4.99 each
  - 1 math set for \$3.99
  - a backpack for \$19.99

Find the total cost including 5% GST and 7% PST.

5. Ravi purchased 3 DVDs for \$19.99 each. Find the total cost for the DVDs including 5% GST and 6% PST.

For help with #6 and #7, refer to Example 2 on page 147.

6. A store discounted items by 50% off the original price one week. The following week an additional 10% was taken off the already reduced price. The regular price of a CD player was \$85.00. What is the reduced price in the second week?

7. A herd of 100 caribou was moved to a new location. The population increased by 10% the first year and then increased by 20% the second year.
- Find the population after the second year.
  - Explain why there was not a 30% increase in population over the two years.

8. Copy and complete the following table. Use 5% GST and the percent of PST applicable to where you live.

Item Purchased	Price	Total Tax	Total Cost
a) Boots	\$119.99		
b) Pants	\$89.99		
c) Gloves	\$39.99		
d) Helmet	\$189.99		

### Apply

9. Arjay was thinking of buying a car worth \$23 000, but delayed purchasing the car for a year. During that year, the cost of the car increased by 3.2%.
- What was the price of the car when Arjay purchased it?
  - What was the total cost of the car including 5% GST and 5% PST?
10. What is the total cost for four tires that sell for \$85 each, plus 5% GST and a 1.5% environment tax?

### MATH LINK

- In one day, a dripping faucet wastes about 25 L of water. A regular toilet flush uses 6 L of water per flush. If you flush your toilet 30 times a day, what percent of the water used by your toilet is wasted by the dripping faucet?
- $\frac{3}{10}$ % of the world's fresh water is held in rivers and lakes. Approximately 9% of that water is used for industry and may be returned to the environment polluted. What percent of the world's fresh water is used by industry?

11. A student is awarded a \$1000 scholarship and places it in an account that pays 3% simple interest per year.
- What is the total value of the scholarship amount at the end of the second year?
  - What is the single percent increase in value of the scholarship after two years?

12. Simon Whitfield of Victoria, British Columbia, won the men's triathlon at the Sydney Olympics. The race consisted of a 1.5-km swim in Sydney Harbour, a 40-km bike ride through Sydney and a 10-km run.



- What percent of the race distance is each component? Express your answer to the nearest tenth of a percent.
- What percent of the race distance is spent on land? Express your answer to the nearest tenth of a percent.

### Extend

13. A ski jacket has been marked down on three occasions, first 20% off, then 25% off the new price, and finally 50% off the previous price. What is the overall percent saved?
14. The selling price of a DVD player is 35% more than its cost. It is sold at a discount of 20% off the selling price. How much does the store still gain?