For help with #1 to #3, refer to Example 1 on page 281.

1. Determine each value.

   a) 60% of 30%

   b) 120% of 82%

   c) 38.5% of 50%

   d) 40% of 0.8%

2. About 2.5% of all the water on Earth is fresh water. About 70% of this fresh water is permanently frozen in glaciers. What percent of all the water on Earth is the fresh water in glaciers?

3. A school decided that they would spend 50% of their equipment budget this year on computer equipment, and that 12.5% of the money spent on computer equipment would be for new printers. What percent of the entire equipment budget will be spent on new printers?

For help with #4 and #5, refer to Example 2 on pages 282–283.

4. Determine each final value.

   a) An initial value of 600 is first increased by 28%, and then the result is decreased by 15%.

   b) An initial value of 1820 is first decreased by 45%, and then the result is increased by 31%.

   c) An initial value of 80 is first increased by 6%, and then the result is increased by 20%.

   d) An initial value of 24 000 is first decreased by 65%, and then the result is decreased by 52%.

5. A herd of 100 caribou was moved to a new location. The population increased by 10% in the first year and then increased by 20% in the second year.


   a) What is the population at the end of the second year?

   b) Explain why there was not a 30% increase in population over the two years.

6. Choose a number. Draw a diagram to show visually the relationships between values and percents when your number is decreased by 40% and then increased by 25%.


7. ✓ **Competency Check** One year a family increases the size of their vegetable garden by 20%. A year later they decrease the size by 20%.

   a) Does this mean that their garden is the same size as it was to start with? Justify your answer mathematically.
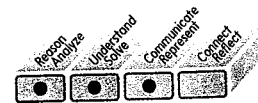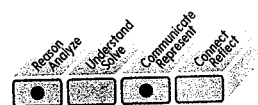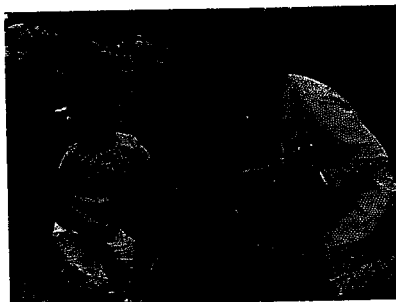
b) Would the final size of the garden be the same if the decrease happened before the increase? Show your thinking.

8. 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.

9. ✓ **Competency Check** The length of the Fraser River is about 1370 km, and the length of the Columbia River is about 2000 km. Copy the statements below and fill in the blanks.
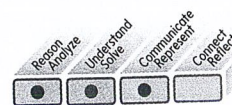
   a) The Columbia River is about ■% of the length of the Fraser River.

   b) The Columbia River is about ■% longer than the Fraser River.

   c) The Fraser River is about ■% of the length of the Columbia River.

   d) The Fraser River is about ■% shorter than the Columbia River.

   e) Use the words *part* and *whole* to explain why none of the percent you wrote in parts a) to d) are the same.

10. Determine a single percent increase or decrease that is equivalent to each of the following:

    a) an increase of 10% followed by a decrease of 40%

    b) a decrease of 35% followed by an increase of 90%

    c) a decrease of 30% followed by an increase of 12%

    d) an increase of 75% followed by a decrease of 15%

11. Which is greater, 60% of 50% of 40%, or 50% of 50% of 50%? Justify your reasoning.

12. What single percent is equivalent to 130% of 120% of 110%?
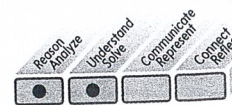
Extend

13. If you increase a number by 62%, what percent decrease do you need to apply to the result to get back to your original number?

14. Samantha places a marker 12 m away from a door. She moves it toward the door so that after every minute that passes, she reduces the distance between the marker and the door by 50%.

    a) Approximately how far away from the door is the marker after 10 minutes?

    b) Will the marker ever reach the door? Explain your thinking.