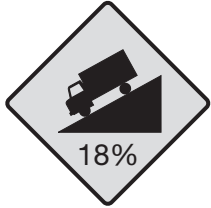# Chapter Review

1. Explain what you think this road sign means.

   e.g., The grade is 18%. Every 100 m of horizontal distance drops a vertical distance of 18 m.

2. Baldwin Street in Dunedin, New Zealand, is one of the steepest streets in the world.
   - The street runs for a horizontal distance of 350 ft.
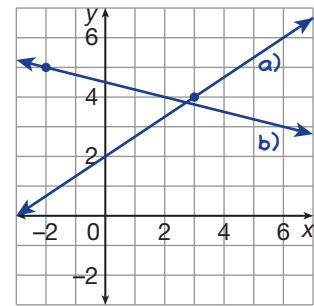   - It rises from 30 ft to 153 ft over this distance.

   What is the grade of Baldwin Street?

   e.g., $\dfrac{153 \text{ ft} - 30 \text{ ft}}{350 \text{ ft}} \times 100\% = 0.351...\%$, or about 35%   The grade is about 35%.

3. Graph each line.

   a) (3, 4), $m = 2:3$

   b) (−2, 5), $m = -1:4$

4. a) What is the slope of the line segment that joins the points?

   $A(5, -8)$ to $B(-6, -14)$

   $$m = \frac{y_2 - y_1}{x_2 - x_1}$$

   $$= \frac{-14 - (-8)}{-6 - 5}$$

   $$= \frac{-6}{-11}, \text{ or } \frac{6}{11}$$

   $C(2, 1)$ to $D(4, 7)$

   $$m = \frac{y_2 - y_1}{x_2 - x_1}$$

   $$= \frac{7 - 1}{4 - 2}$$

   $$= \frac{6}{2}, \text{ or } 3$$

   b) Which line segment in Part a) is steeper? Explain.

   CD is steeper. e.g., Its slope is 3. That is greater than the slope of AB.

5. Explain how $\dfrac{\text{rise}}{\text{run}}$ and $\dfrac{y_2 - y_1}{x_2 - x_1}$ both represent the slope formula.

   e.g., Rise is the vertical distance or the change between y-values. Run is the horizontal distance or the change between x-values.

6. Ayaka is a real estate agent. She sold a house for $190 000. It sold for $268 000 11 yr later. What is the average rate of change in price, to the nearest dollar?

e.g., $\dfrac{\$268\,000 - \$190\,000}{11\text{ yr} - 0\text{ yr}} \doteq \$7091/\text{yr}$

The average rate of change was $7091/yr, to the nearest dollar.

7. Suppose the price of the house in Question 6 continues to rise at the same rate. What would it be worth in 5 yr?

e.g., $\$7091 \times 5 + \$268\,000 = \$303\,455$ It would be worth $303 455 in 5 yr.

8. Ruth is a surveyor. She is using a sight to measure the height of a cliff. What is the height of the cliff, to the nearest metre?
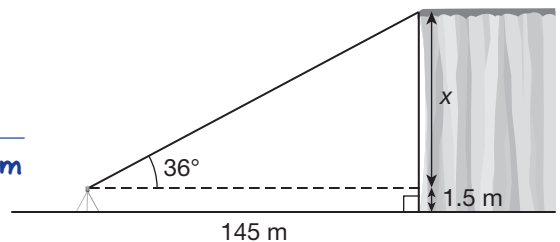
e.g., $\tan 36° = \dfrac{x}{145\text{ m}}$

$145\text{ m} \times \tan 36° = 145\text{ m} \times \dfrac{x}{145\text{ m}}$

$105.348...\text{ m} = x$

Height: $105.348...\text{ m} + 1.5\text{ m} = 106.848...\text{ m}$
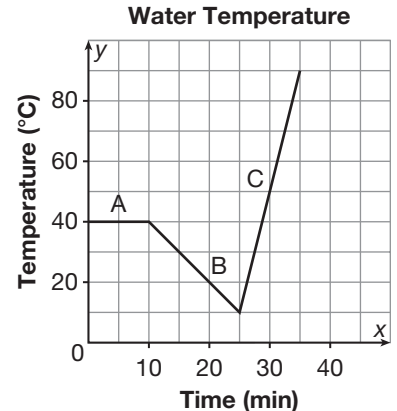
The height of the cliff is about 107 m.

9. Hayvn is conducting a science experiment. He plotted the following data. What is the rate of change for each section? What does each rate of change mean?

Section A: 0 °C/min; no change in temperature

Section B: −2 °C/min; temperature decreases by 2 °C/min

Section C: 8 °C/min; temperature increases by 8 °C/min

Water Temperature

10. Earth rotates at about 465 m/s at the equator.

a) What is this speed in kilometres per hour?

e.g., $465\text{ m/s} \times \dfrac{1\text{ km}}{1000\text{ m}} \times \dfrac{3600\text{ s}}{1\text{ h}} = 1674\text{ km/h}$

Earth rotates at about 1674 km/h at the equator.

b) What is this speed in miles per hour?

e.g., $1674\text{ km/h} \times \dfrac{1\text{ mi}}{1.61\text{ km}} = 1039.751...\text{ mi/h}$

Earth rotates at about 1040 mi/h at the equator.

Hint

1 mi $\doteq$ 1.61 km