## 6.5 Find an Equation for a Line Given the Slope and a Point

***Principles of Mathematics 9*, pages 330–337**

**A**

**1.** Find the equation of a line with the given slope and passing through the given point.

**a)** $m = 2$, P(4, 5)

**b)** $m = -4$, P(–3, –2)

**c)** $m = \frac{3}{5}$, P(5, –1)

**d)** $m = -\frac{1}{4}$, P(2, 6)

**2.** Find the equation of a line with the given slope and passing through the given point.

**a)** $m = 0$, P(5, –4)

**b)** $m = 3$, $P\left(\frac{2}{3}, \frac{1}{4}\right)$

**c)** $m = \frac{2}{3}$, P(0, 0)

**d)** $m = \frac{1}{2}$, P(–3, –4)

**3.** Find the equation of a line

**a)** with a slope of 5, passing through (2, 3)

**b)** with a slope of –4, passing through (–3, 5)

**c)** parallel to $y = 2x + 5$, passing through (3, 2)

**d)** perpendicular to $y = 3x - 4$, passing through (5, –3)

**e)** parallel to $y = 4$, passing through (2, 3)

**f)** perpendicular to $y = -2$, passing through (–3, 1)

**4.** Find the equation of a line.

**a)** parallel to $y = \frac{1}{2}x + 3$, passing through the origin

**b)** perpendicular to $y = -\frac{5}{2}x + 3$, passing through (–2, –3)

**c)** parallel to $y = -2x + 3$, passing through (0, 0)

**d)** perpendicular to $y = 3x + 4$, passing through (0, 0)

**B**

**5.** Find an equation for the line parallel to $3x + 5y - 4 = 0$, with the same $x$-intercept as $2x - 3y - 6 = 0$.

**6.** Find an equation for the line perpendicular to $2x + 5y - 3 = 0$, with the same $y$-intercept as $2x + 3y + 6 = 0$.

**7.** In Ottawa, you can ride on a tour bus for a fixed price plus a variable amount that depends on the length of the trip. The variable cost is \$2/km and a 20-km trip costs \$55.

**a)** Determine the equation relating cost, $C$, in dollars, and distance, $d$, in kilometres.

**b)** Use your equation to find the cost of a 15-km tour.

**c)** Graph the relation.

**d)** Use the graph to find the cost of a 15-km tour.

**8.** Refer to question 7.

**a)** Copy and complete the table to solve the problem using a third method. Explain this method.

| Distance (km) | Cost ($) | First Differences |
|---|---|---|
| 2 | 19 | |
| 3 | 21 | 2 |
| 4 | | |
| 5 | | |
| 6 | | |

**b)** Use all three methods (equation, graph, and table) to determine how far you could travel on the tour bus for $105.

**c)** Use each method to determine the cost of a 10.5 km tour.

**d)** Describe at least one advantage and one disadvantage to each method of solution.

**9.** **Use Technology** A city taxi charges $3/km and a fixed cost. A 5-km taxi ride costs $21. Use *The Geometer's Sketchpad*® to find

**a)** the fixed cost

**b)** the equation relating cost, $C$, in dollars, and distance, $d$, in kilometres

**c)** the equation using another method to check your results.

## C

**10.** Ahmed has been running at an average speed of 15 km/h towards the finish line of a 45 km race for 2 h, when he sees a checkpoint sign shown.


**a)** What does the ordered pair (2, 15) mean?

**b)** The slope is $m = -15$. What does this value represent? Why is it negative?

**c)** Determine the value of $b$.

**d)** Write an equation relating distance and time.

**e)** Graph the relation. What is the meaning of the $d$-intercept?

**f)** How long will the race take, in total?

**g)** Has Ahmed reached the halfway point of his race yet? Explain.

**11.** Emeline has been driving at an average speed of 100 km/h towards Hamilton for 2 h, when she sees the sign shown.


**a)** What does the ordered pair (2, 300) mean?

**b)** The slope is $m = -100$. What does this value represent? Why is it negative?

**c)** Determine the value of $b$.

**d)** Write an equation relating distance and time.

**e)** Graph the relation. What is the meaning of the $d$-intercept?

**f)** How long will the car drive take, in total?

**g)** Has Emeline reached the halfway point of her trip yet? Explain.