Review - Linear Functions

1. A school plans to build a wheelchair ramp from the sidewalk to the front entrance of the school. The slope of the ramp must be $\frac{3}{32}$. The entrance to the school is 75 cm above the ground. What is the horizontal distance needed for the ramp?

2. The coordinates of the endpoints of segments are given below. Are the two line segments parallel, perpendicular, or neither?
   a) R(–5, 20), S(–30, –10) and T(3, –1), U(9, 4)
   b) F(–7, –8), G(–4, 1) and V(–10, 25), W(35, 10)

3. A line has *x*-intercept –8 and *y*-intercept 5. Determine the slope of a line perpendicular to this line.

4. Write this equation in general form:
   $y - 5 = \frac{3}{5}(x + 5)$

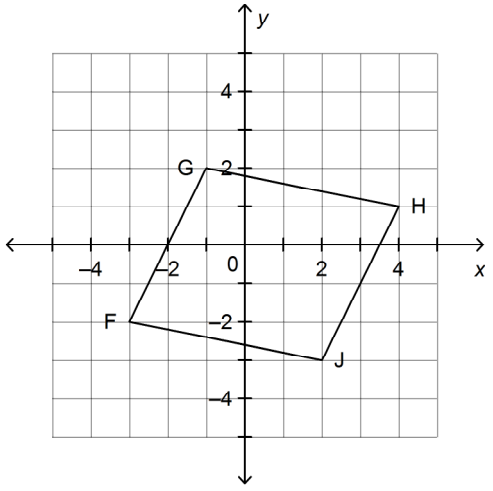
5. A line has *x*-intercept –8 and *y*-intercept 3. Determine the equation of the line in general form.

6. Four students determined the slope of the line through S(7, –5) and T(–15, 11). Their answers were: $\frac{11}{8}$, $-\frac{11}{8}$, $\frac{8}{11}$, and $-\frac{8}{11}$.
   Which answer is correct? How do you know?

7. Students at Tahayghen Secondary School sell punch during the school carnival. The number of cups sold, *n*, is a linear function of the temperature in degrees Celsius, *t*. The students sold 471 cups when the temperature was 26°C. They sold 547 cups when the temperature was 30°C.
   a) Write an equation in slope-point form to represent this function.
   b) Use the equation in part a to determine the approximate temperature when the students sell 319 cups of punch.

8. Construction workers are paving a road. The road must drop 4 cm for every 650 cm measured horizontally.
   a) What is the slope of the road?
   b) Suppose a section of the road drops 24.5 cm. How long is this section of the road measured horizontally?

9. Reggie says FGHJ is a parallelogram. Ann says FGHJ is a rectangle. Who is correct? Justify your answer.



10. The coordinates of the vertices of ΔGBW are G(20, 10), B(–35, 20), and W(5, –10). Is ΔGBW a right triangle? Justify your answer.

11. Given A(18, 9), B(6, 27), and C(6, 9), determine the coordinates of point D such that CD is parallel to AB and D is on the:
    i) *y*-axis
    ii) *x*-axis

12. Francine runs a T-shirt company. For each order she receives, Francine charges a flat fee of $50, plus $8.95 per T-shirt .
    a) Write an equation for the total cost, *C* dollars, for ordering *n* T-shirts.
    b) Marnell ordered 62 T-shirts. What was the total cost?
    c) Jakub paid a total cost of $971.85. How many T-shirts did he order?

13. In Jay's business, the annual cost of operating a car, *c*, is a linear function of the number of kilometres the car is driven, *k*. The annual cost of operating a car that has been driven 19 375 km is approximately $3875. The annual cost of operating a car that has been driven 20 000 km is approximately $3900.
    a) Write an equation in slope-point form to represent this function.
    b) Use the equation in part a to determine how many kilometres a car has been driven when the annual operating cost is approximately $4350.

14. Write an equation for the line that passes through B(–1, 3) and is:
    a) parallel to the line $y = -\frac{7}{3}x - 3$
    b) perpendicular to the line $y = -\frac{7}{3}x - 3$

15. Determine the value of *k* when the equations $3kx - 7y - 10 = 0$ and $2x + y - 7 = 0$ represent lines that are:
    a) parallel
    b) perpendicular

16. Charles's Gas Law states that the volume, *v*, of a fixed mass of gas at a constant pressure varies directly with its absolute temperature, *t*. At 27°C, the volume of a certain amount of air is 500 mL. When the air is heated to 90°C, the volume increases to 605 mL.
    a) Write an equation in general form for this relation.
    b) Determine the volume of the air when its temperature is 60°C.
    c) Determine the temperature of the air when its volume is 1010 mL.

Review - Linear Functions
Answer Section

1. 800 cm, or 8 m
2. a) Neither
   b) Perpendicular
3. $-\frac{8}{5}$
4. $3x - 5y + 40 = 0$
5. $3x - 8y + 24 = 0$
6. $-\frac{8}{11}$.
7. a) $n - 471 = 19(t - 26)$ b) 18°C.
8. a) $-\frac{2}{325}$. b) 3981.25 cm
9. Reggie is correct.
10. ΔGBW is a right triangle.
11. i) (0, 18).

    ii) (12, 0).
12. a) $C = 8.95n + 50$

    b) $604.90.

    c) 103 T-shirts.
13. a) $c - 3875 = 0.04(k - 19\,375)$

    b) 31 250 km.
14. a) $y - 3 = -\frac{7}{3}(x + 1)$

    b) $y - 3 = \frac{3}{7}(x + 1)$
15. a) When the lines are parallel, k is $-\frac{14}{3}$.

    b) When the lines are perpendicular, k is $\frac{7}{6}$.
16. a) $5t - 3v + 1365 = 0$

    b) 555 mL.

    c) 333°C.