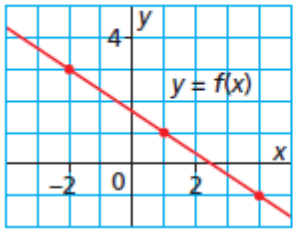
Math 10

Lesson 4-8 Love those linear functions

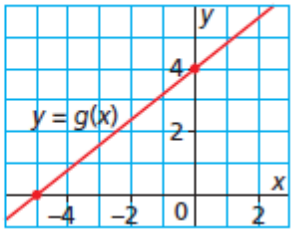
I. Assignment

1. Determine the slope of each line.

a)



b)



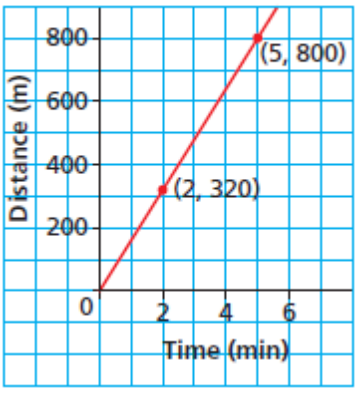
2. For each line described below, is its slope positive, negative, zero, or undefined? Justify your answer.
   a) As x increases by 3, y decreases by 2.
   b) The line has a negative x-intercept and a negative y-intercept.
   c) The line has a y-intercept but does not have an x-intercept.

3. A line passes through A(–3, 1). For each slope given below:
   i) Sketch the line through A with that slope.
   ii) Write the coordinates of three other points on the line.

   a) –1 b) $\frac{1}{4}$ c) $-\frac{3}{2}$

4. Gabrielle likes to jog and has a pedometer to measure how far she runs. She checks her pedometer periodically and records its readings. Gabrielle plotted these data on a grid.
   a) What is the slope of the line and what does it represent?
   b) How is slope related to rate of change?
   c) Assume Gabrielle continues to run at the same rate.
      i) How far did Gabrielle jog in 4 min?
      ii) How long will it take Gabrielle to jog 1000 m?

Graph of Gabrielle's Run

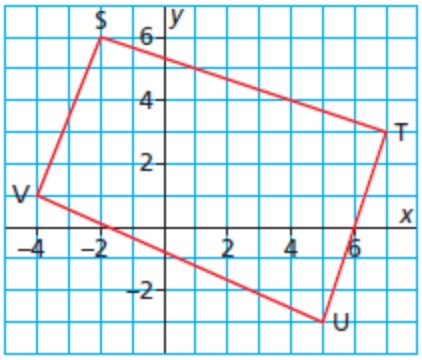


5. The slope of line FG is given. What is the slope of a line that is:
   i) parallel to FG? ii) perpendicular to FG?

   a) 3 b) $-\frac{6}{5}$ c) $\frac{11}{8}$ d) 1

6. The coordinates of two points on two lines are given. Are the two lines parallel, perpendicular, or neither? Justify your choice.
   a) H(–3, 3), J(–1, 7) and K(–1, 2), M(5,–1)
   b) N(–4,–2), P(–1, 7) and Q(2, 5), R(4,–1)

7. Is quadrilateral STUV a parallelogram? Justify your answer.



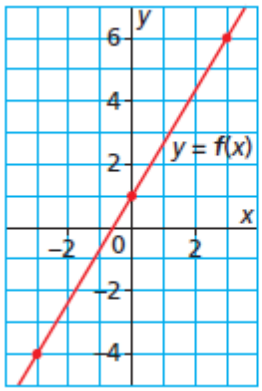
8. Triangle ABC has vertices A(–1,–1), B(2, 5), and C(6, 3). Is ΔABC a right triangle? Justify your answer.

9. Sketch graphs to help explain what happens to the graph of $y = 3x + 4$ when:
   a) the coefficient of x increases by 1 each time until the coefficient is 6
   b) the constant term decreases by 1 each time until it is –4

10. For each equation, identify the slope and y-intercept of its graph, then draw the graph.
   a) $y = -3x + 4$ b) $y = \frac{3}{4}x - 2$

11. For each graph:
   i) Determine its slope and y-intercept.
   ii) Write an equation that describes the graph.
   iii) Verify your equation.

a)



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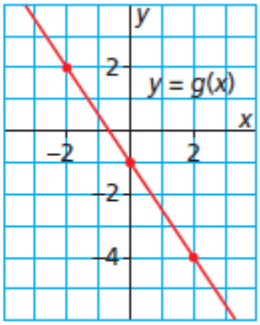
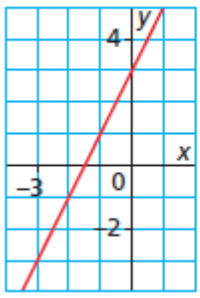
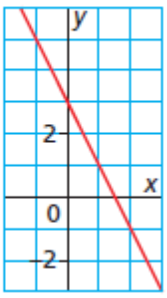


12. Match each equation with its graph.
   a) $y = \frac{1}{2}x - 3$ b) $y = -3x - 2$ c) $y = 2x + 3$ d) $y = -2x + 3$

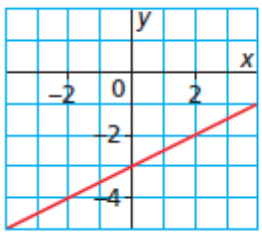
Graph A



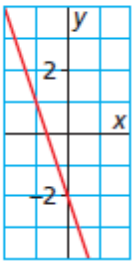
Graph B



Graph C



Graph D



13. Mason had $40 in his bank account when he started to save $15 each week.
    a) Write an equation to represent the total amount, *A* dollars, he had in his account after *w* weeks.
    b) After how many weeks did Mason have $355 in his account?
    c) Suppose you graphed the equation you wrote in part a. What would the slope and the vertical intercept of the graph represent?

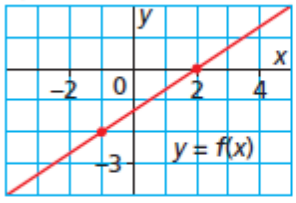
14. Consider the graph of $y = \frac{4}{7}x - 5$.
    a) Write 2 equations that describe 2 different lines that are parallel to this line. How do you know all 3 lines are parallel?
    b) Write 2 equations that describe 2 different lines that are perpendicular to this line. How do you know that the 2 new lines are perpendicular to the original line?

15. Line DE passes through F(–2, 3) and is perpendicular to the line described by the equation $y = 2x + 1$. Write an equation for line DE.

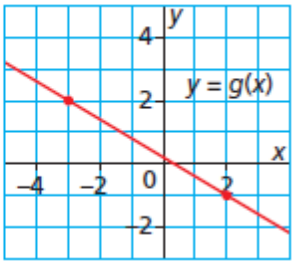
16. For each equation below:
    i) Identify the slope of its graph and the coordinates of a point on the graph.
    ii) Graph the equation.
    iii) Choose a different point on the graph, then write its equation in a different way.
    a) $y + 4 = 2(x + 3)$
    b) $y - 1 = -\frac{1}{3}(x - 4)$

17. Write an equation for each graph. Verify that the equation is correct.

a)



b)



18.
    a) Write an equation for the line that passes through each pair of points. Describe your strategy.
        i) G(–3,–7) and H(1, 5)
        ii) J(–3, 3) and K(5,–1)
    b) Use each equation you wrote in part a to determine the coordinates of another point on each line.

19. Two families went on a traditional nuuchahnulth dugout canoe tour in Tofino harbour, B.C. One family paid $220 for 5 people. The other family paid $132 for 3 people.
    a) Choose variables, then write an equation for the cost as a function of the number of people.
    b) What is the cost per person? How can you determine this from the equation?
    c) A third family paid $264. How many people went on the tour?

20. a) Why is each equation not considered to be in general form?

i) $4y-5x-40=0$ ii) $\frac{1}{3}x+y=4$

iii) $y-2=\frac{1}{3}(x+4)$ iv) $y=\frac{1}{5}x+3$

b) Write each equation in part a in general form.

21. a) Graph each equation.

i) $3x-4y-24=0$ ii) $x-3y+12=0$

b) What is the slope of each line in part a? How did you determine the slopes?

22. The difference between two numbers, *g* and *l,* is 6.

a) Generate some data for this relation, then graph the data.

b) Write an equation in general form to relate *g* and *l*.

c) Use the graph to list 5 pairs of numbers that have a difference of 6.

23. Which equations are equivalent? How did you determine your answers?

a) $y=\frac{2}{5}x+1$ b) $y-3=\frac{2}{5}(x-4)$

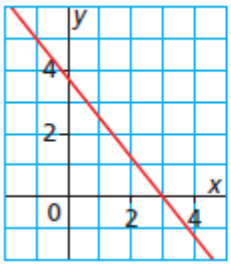
c) $y-1=\frac{2}{5}(x-1)$ d) $y-3=\frac{2}{5}(x-5)$

e) $2x-5y+7=0$ f) $2x-5y-5=0$

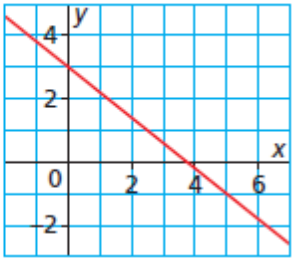
24. Match each equation with its graph below. Justify each choice.

a) $y=-\frac{4}{5}x+3$ b) $y-3=-\frac{5}{4}(x+3)$ c) $5x+4y-15=0$

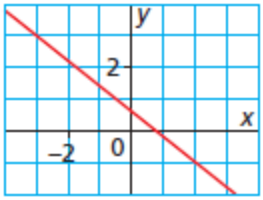
Graph A



Graph B



Graph C



25. Max babysits for 2 families. One family pays him $5 an hour, the other family pays $4 an hour. Last week, Max earned $60.

a) Generate some data for this relation, then graph the data.

b) Write an equation for the relation. Explain what each variable represents.