

The function in the Solve It is a linear function. A family of functions is a group of functions with common characteristics. A *parent function* is the simplest function with these characteristics. The <u>linear parent function</u> is y = x or f(x) = x. The graphs of three linear functions are shown at the right.



A <u>linear equation</u> is an equation that models a linear function. In a linear equation, the variables cannot be raised to a power other than 1. So y = 2x is a linear

function, but  $y = x^2$  and  $y = 2^x$  are not. The graph of a linear equation contains all the ordered pairs that are solutions of the equations.

Graphs of linear functions may cross the y-axis at any point. A <u>y-intercept</u> of a graph is the y-coordinate of a point where the graph crosses the y-axis. You can use the slope and y-intercept of a line to write and graph an equation of the line.

#### KEY CONCEPT: SLOPE-INTERCEPT FORM OF A LINEAR EQUATION

The *slope-intercept form* of a linear equation of a nonvertical line is:

$$y = mx + b$$

#### PROBLEM 1: IDENTIFYING SLOPE AND Y-INTERCEPT

Find the slope and y-intercept of each equation.

a) $y = 5x - 2$	b) $y = -x + 4$	c) $y = 7x$	d) $y = 4$

e)  $y = \frac{1}{2}x + \frac{2}{3}$  f) y = -3x + 2 g) 3x + 4y = 12 h) x = 2

## PROBLEM 2: WRITING AN EQUATION IN SLOPE-INTERCEPT FORM

Write an equation in slope-intercept form of the line with the given slope **m** and y-intercept **b**.

a)  $m = -\frac{4}{5}, b = 7$  b) m = 4, b = -2 c) m = -2, b = 5

d) 
$$m = \frac{1}{2}, b = -\frac{1}{2}$$
 e)  $m = \frac{7}{10}, b = 3$  f)  $m = -2, b = \frac{8}{5}$ 

## PROBLEM 3: WRITING AN EQUATION FROM A GRAPH

Write an equation in slope-intercept form of each line.















## PROBLEM 4: WRITING AN EQUATION FROM TWO POINTS

Write an equation in slope-intercept form of the line that passes through the given points.a) (2,1) and (5,-8)b) (0,3) and (2,5)c) (-2,4) and (3,-1)

d) (3, -2) and (1, -3)

e) (3, -3) and (1, 2)

f) (-2, -4) and (0,5)

## PROBLEM 5: GRAPHING A LINEAR EQUATION

Graph each equation.

a) 
$$y = 2x - 1$$



b) 
$$y = \frac{2}{3}x - 4$$



c) 
$$y = -\frac{1}{2}x + 3$$



d) 
$$y = -3x + 4$$
  
e)  $y = \frac{5}{6}x - 2$   
f)  $y = -\frac{2}{3}x + 5$ 

#### **PROBLEM 6: MODELING A FUNCTION**

a) Water pressure can be measured in atmospheres (*atm*). At the surface of the water, the pressure is 1 *atm*. As the depth increases, the pressure increases by 0.1 atm/m. Write an equation that models the pressure y at a depth of x meters. Graph the function.



b) A plumber charges a \$65 fee for a repair plus \$35 per hour. Write an equation to model the total cost y of a repair that takes x hours. Graph the function that models the total cost.



Name \_\_\_\_\_ 5-3 Practice Worksheet

## *Identify the slope and y-intercept for each equation.*

1. 
$$y = \frac{2}{3}x - 4$$
  
2.  $y - 3x = \frac{1}{2}$   
3.  $2y - 6x = 10$ 

## Write an equation for the line with the given slope and y-intercept.

4.  $m = \frac{2}{5}, b = 5$  5. m = 0.3, b = -1.5

## Write an equation for the lines shown on each graph.



Period \_\_\_\_\_

16. When the Bryants leave town for a vacation, they put their dog Tyco in a kennel. The kennel charges \$15 for an immediate flea bath and \$5 per day.

- a.) Write and equation in slope-intercept form to represent the situation.
- b.) Graph the equation.
- c.) Explain why only Quadrant I is needed to graph this situation.



# 17. Which equation has the same y-intercept as y = 4x - 3? a) y-3=x b) y=8x+3 c) 3-y=4x d) y=-3+8x

18. Which of the following is the equation of the line that has the same slope as  $y = -\frac{3}{2}x + 2$  and the same y-intercept as y = 3x - 2?

a)  $y-2 = -\frac{3}{2}x$  b)  $-\frac{3}{2}x = y+2$  c)  $y+2 = -\frac{3}{2}$  d)  $-\frac{3}{2}x = y+3$ 

19. A software company started with 2 employees. In 6 months, the company had 7 employees. The number of employees increased at a steady rate. Which equation models the relationship between the number of employees *n* and the number of months *m* since the company started?

a) 
$$n = \frac{5}{6}m + 2$$
 b)  $m = 2n + \frac{5}{6}$  c)  $n = \frac{6}{5}m + 2$  d)  $m = \frac{5}{6}n + 2$ 

20. A line passes through the points (0,3) and (1,5). Graph this line and find an equation for the line in slope-intercept form.

