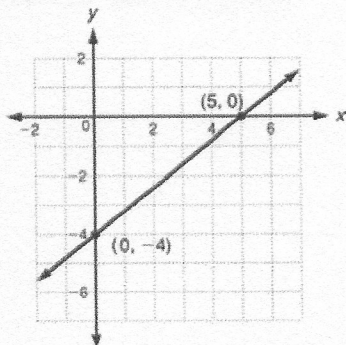


**LESSON**  
**4-5**
**Equations of Parallel and Perpendicular Lines**
**Practice and Problem Solving: A/B**

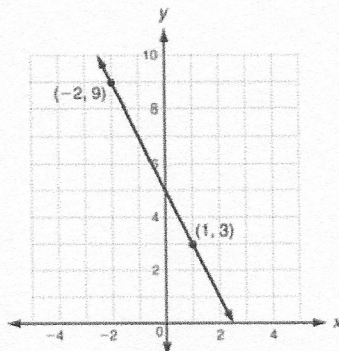
Find the slope of the line.

1.



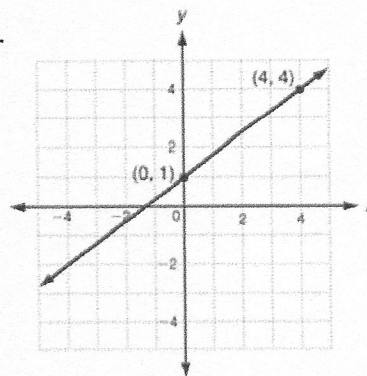
slope =  $\frac{4}{5}$

2.



slope =  $-\frac{6}{3} = -2$

3.



slope =  $\frac{3}{4}$

Find the slope of the line that is between the two given points.

4.  $A(8,0), B(3,-2)$

$$\frac{-2-0}{3-8} = \frac{-2}{-5} = \frac{2}{5}$$

5.  $A(-2,-4), B(6,1)$

$$\frac{-4-1}{-2-6} = \frac{-5}{-8} = \frac{5}{8}$$

6.  $A(1,6), B(-2,-3)$

$$\frac{-3-6}{-2-1} = \frac{-9}{-3} = 3$$

7.  $A(-3,2), B(5,-4)$

$$\frac{-4-2}{5-(-3)} = \frac{-6}{8} = \frac{-3}{4}$$

For Problems 8-15, write an equation of the line parallel to the given line through the given point.

8.  $y = 9x + 4$

through  $(2, 7)$ 

$$y - 7 = 9(x - 2)$$

9.  $y = 4x - 6$

through  $(6, -3)$ 

$$y + 3 = 4(x - 6)$$

10.  $y = \frac{2}{3}x + 6$

through  $(-3, 6)$ 

$$y - 6 = \frac{2}{3}(x + 3)$$

11.  $y = -\frac{1}{4}x - 12$

through  $(12, 10)$ 

$$y - 10 = -\frac{1}{4}(x - 12)$$

12.  $(0, -1), y = -2x + 3$

$$y + 1 = -2(x - 0)$$

13.  $(3, 8), y = \frac{1}{5}(x + 4)$

$$y - 8 = \frac{1}{5}(x - 3)$$

14.  $(-2, 6), x = -5 \rightarrow \text{slope} = \text{undef.}$   
 $x = -2$

15.  $(4, 0), -x + 2y = 12 \rightarrow 2y = x + 12$   
 $y = \frac{1}{2}x + 6$   
 $y - 0 = \frac{1}{2}(x - 4)$   
 $\text{slope} = \frac{1}{2}$

**For Problems 16-23, write an equation of the line perpendicular to the given line through the given point.**

16.  $y = \frac{1}{4}x + 3 \rightarrow \text{slope} = -4$   
 through  $(4, 1)$   
 $y - 1 = -4(x - 4)$

17.  $y = \frac{1}{3}x - 6 \rightarrow \text{slope} = 3$   
 through  $(-2, 8)$   
 $y - 8 = 3(x + 2)$

18. perpendicular to  $y = -6x - 9$   
 through  $(6, 10) \rightarrow \text{slope} = \frac{1}{6}$   
 $y - 10 = \frac{1}{6}(x - 6)$

19. perpendicular to  $y = 5x + 14$   
 through  $(5, -3) \rightarrow \text{slope} = -\frac{1}{5}$   
 $y + 3 = -\frac{1}{5}(x - 5)$

20.  $(0, 0), y = -9x - 1 \rightarrow \text{slope} = \frac{1}{9}$   
 $y - 0 = \frac{1}{9}(x - 0)$

21.  $(4, -6), y = -3 \rightarrow \text{slope} = \text{undef.}$   
 $x = 4$

22.  $(2, 3), y - 4 = -2(x + 3) \rightarrow \text{slope} = \frac{1}{2}$   
 $y - 3 = \frac{1}{2}(x - 2)$

23.  $(-8, 0), 3x - 5y = 6 \rightarrow -5y = -3x + 6$   
 $y = \frac{3}{5}x - \frac{6}{5}$   
 $y - 0 = -\frac{5}{3}(x + 8)$   
 $\text{slope} = -\frac{5}{3}$

24. A triangle has vertices  $L(0, 6)$ ,  $M(5, 8)$ , and  $N(4, -1)$ . Is the triangle a right triangle? Explain your reasoning.

$\text{slope } \overline{LM} = \frac{8-6}{5-0} = \frac{2}{5}$   
 $\text{slope } \overline{MN} = \frac{-1-8}{4-5} = \frac{-9}{-1} = 9$   
 $\text{slope } \overline{LN} = \frac{-1-6}{4-0} = \frac{-7}{4}$

none perp., so not right triangle

**Find a value for  $k$  based on the given description.**

30. The line through  $(-1, k)$  and  $(-7, -2)$  is parallel to the line  $y = x + 1$ .  $\rightarrow$  slope = 1

$$\frac{k - (-2)}{-1 - (-7)} = 1$$

$$\frac{k + 2}{6} = 1$$

$$k + 2 = 6$$

$$k = 4$$

31. The line through  $(k, 2)$  and  $(7, 0)$  is perpendicular to the line  $y = x - \frac{28}{5}$

$$\rightarrow \text{slope} = -1$$

$$\frac{2 - 0}{k - 7} = -1$$

$$2 = -(k - 7)$$

$$2 = -k + 7$$

$$-5 = -k$$

$$k = 5$$