Name _____ Date _____ Class_____

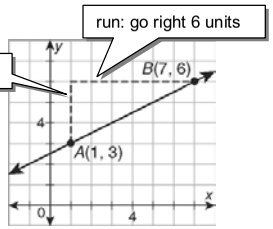
LESSON 3-5

Reteach

Slopes of Lines

The **slope** of a line describes how steep the line is. You can find the slope by writing the ratio of the **rise** to the **run.**

$$\text{slope} = \frac{\text{rise}}{\text{run}} = \frac{3}{6} = \frac{1}{2}$$



You can use a formula to calculate the slope m of the line through points (x_1, y_1) and (x_2, y_2).

Change in y-values

$$m = \frac{\text{rise}}{\text{run}} = \frac{y_2 - y_1}{x_2 - x_1}$$

Change in x-values

To find the slope of $\overline{AB}$ using the formula, substitute (1, 3) for (x_1, y_1) and (7, 6) for (x_2, y_2).

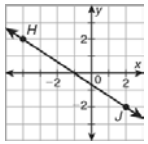
$$m = \frac{y_2 - y_1}{x_2 - x_1}$$ Slope formula

$$= \frac{6-3}{7-1}$$ Substitution

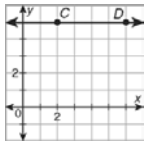
$$= \frac{3}{6}$$ Simplify.

$$= \frac{1}{2}$$ Simplify.

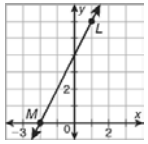
Use the slope formula to determine the slope of each line.



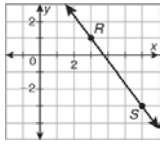
1. $\overleftrightarrow{HJ}$



2. $\overleftrightarrow{CD}$



3. $\overleftrightarrow{LM}$



4. $\overleftrightarrow{RS}$

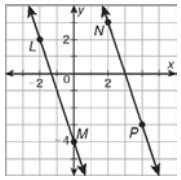
Name _____ Date _____ Class_____

LESSON 3-5

Reteach

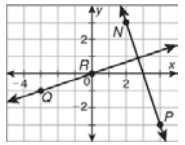
Slopes of Lines continued

Slopes of Parallel and Perpendicular Lines



slope of $\overleftrightarrow{LM} = -3$
slope of $\overleftrightarrow{NP} = -3$

Parallel lines have the same slope.



slope of $\overleftrightarrow{NP} = -3$
slope of $\overleftrightarrow{QR} = \frac{1}{3}$

product of slopes:

$$-3\left(\frac{1}{3}\right) = -1$$

Perpendicular lines have slopes that are *opposite reciprocals*. The product of the slopes is –1.

Use slopes to determine whether each pair of distinct lines is parallel, perpendicular, or neither.

5. slope of $\overleftrightarrow{PQ} = 5$
   slope of $\overleftrightarrow{JK} = -\frac{1}{5}$

   _____

6. slope of $\overleftrightarrow{EF} = -\frac{3}{4}$
   slope of $\overleftrightarrow{CD} = -\frac{3}{4}$

   _____

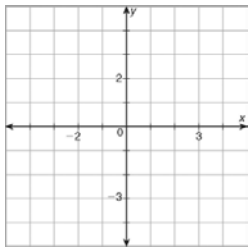
7. slope of $\overleftrightarrow{BC} = -\frac{5}{3}$
   slope of $\overleftrightarrow{ST} = \frac{3}{5}$

   _____

8. slope of $\overleftrightarrow{WX} = \frac{1}{2}$
   slope of $\overleftrightarrow{YZ} = -\frac{1}{2}$

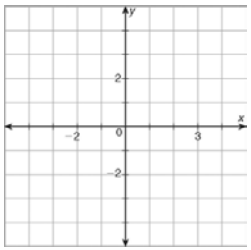
   _____

Graph each pair of lines. Use slopes to determine whether the lines are parallel, perpendicular, or neither.



9. $\overleftrightarrow{FG}$ and $\overleftrightarrow{HJ}$ for $F(-1, 2)$, $G(3, -4)$, $H(-2, -3)$, and $J(4, 1)$

   _____



10. $\overleftrightarrow{RS}$ and $\overleftrightarrow{TU}$ for $R(-2, 3)$, $S(3, 3)$, $T(-3, 1)$, and $U(3, -1)$

    _____

PRACTICE AND PROBLEM SOLVING

Independent Practice

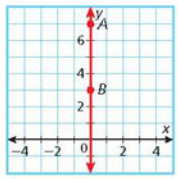
For Exercises	See Example
10–13	1
14	2
15–17	3

Extra Practice

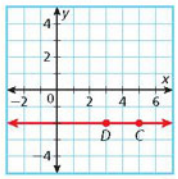
See Extra Practice for more Skills Practice and Applications Practice exercises.

Use the slope formula to determine the slope of each line.

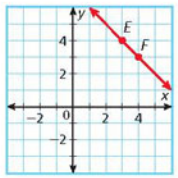
10. $\overleftrightarrow{AB}$



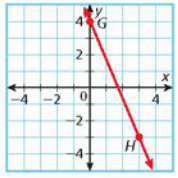
11. $\overleftrightarrow{CD}$



12. $\overleftrightarrow{EF}$



13. $\overleftrightarrow{GH}$



14. **Aviation** A pilot traveling at a constant speed flies 100 miles by 2:30 P.M. and 475 miles by 5:00 P.M. Graph the line that represents the pilot's distance flown. Find and interpret the slope of the line.

Graph each pair of lines. Use slopes to determine whether the lines are parallel, perpendicular, or neither.

15. $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$ for $A(2, -1)$, $B(7, 2)$, $C(2, -3)$, and $D(-3, -6)$
16. $\overleftrightarrow{XY}$ and $\overleftrightarrow{ZW}$ for $X(-2, 5)$, $Y(6, -2)$, $Z(-3, 6)$, and $W(4, 0)$
17. $\overleftrightarrow{JK}$ and $\overleftrightarrow{JL}$ for $J(-4, -2)$, $K(4, -2)$, and $L(-4, 6)$
18. **Geography** A point on a river has an elevation of about 1150 meters above sea level. The length of the river from that point to where it enters the sea is about 2400 km. Find and interpret the slope of the river.

For $F(7, 6)$, $G(-3, 5)$, $H(-2, -3)$, $J(4, -2)$, and $K(6, 1)$, find each slope.

19. $\overleftrightarrow{FG}$ 20. $\overleftrightarrow{GJ}$ 21. $\overleftrightarrow{HK}$ 22. $\overleftrightarrow{GK}$

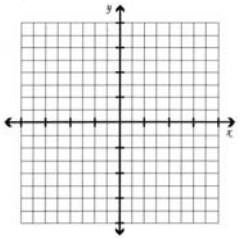
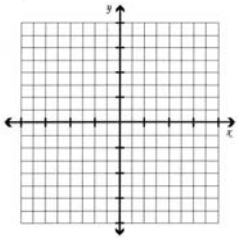
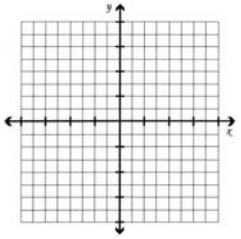
23. **Critical Thinking** The slope of $\overleftrightarrow{AB}$ is greater than 0 and less than 1. Write an inequality for the slope of a line perpendicular to $\overleftrightarrow{AB}$.

24. **Write About It** Two cars are driving at the same speed. What is true about the lines that represent the distance traveled by each car at a given time?

MULTI-STEP TEST PREP

25. A traffic engineer calculates the speed of vehicles as they pass a traffic light. While the light is green, a taxi passes at a constant speed. After 2 s the taxi is 132 ft past the light. After 5 s it is 330 ft past the light.
    a. Find the speed of the taxi in feet per second.
    b. Use the fact that 22 ft/s = 15 mi/h to find the taxi's speed in miles per hour.

COMPLETE #10-13, 15-17, 19-22

10)	11)
12)	13)
15) 	16) 
17) 	19)
20)	21)
22)	