

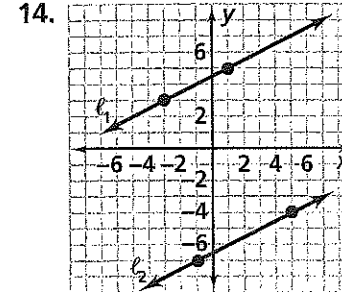
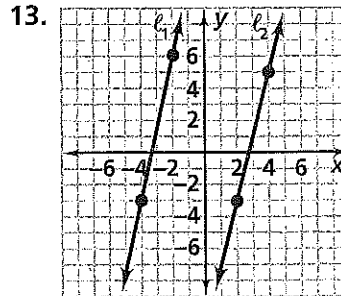
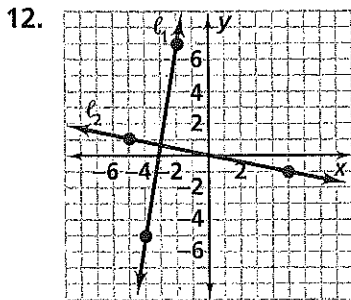
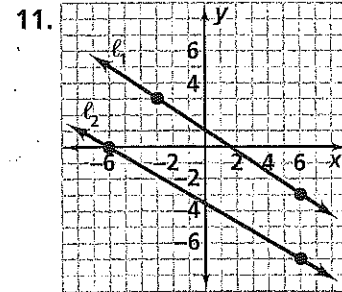
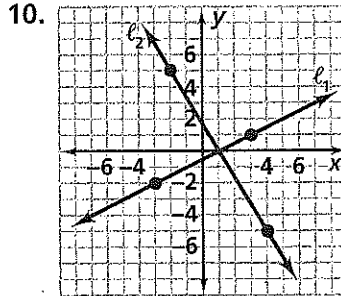
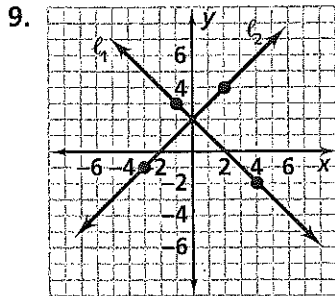
Practice 3-6

Slopes of Parallel and Perpendicular Lines

Are the lines parallel, perpendicular, or neither? Explain.

- | | | | |
|------------------------|---------------------------|---------------------------|--------------------------------------|
| 1. $y = 3x - 2$ | 2. $y = \frac{1}{2}x + 1$ | 3. $\frac{2}{3}x + y = 4$ | 4. $-x - y = -1$ |
| $y = \frac{1}{3}x + 2$ | $-4y = 8x + 3$ | $y = -\frac{2}{3}x + 8$ | $y + x = 7$ |
| 5. $y = 2$ | 6. $3x + 6y = 30$ | 7. $y = x$ | 8. $\frac{1}{3}x + \frac{1}{2}y = 1$ |
| $x = 0$ | $4y + 2x = 9$ | $8y - x = 8$ | $\frac{3}{4}y + \frac{1}{2}x = 1$ |

Are lines l_1 and l_2 parallel, perpendicular, or neither? Explain.



Write an equation for the line perpendicular to \overleftrightarrow{XY} that contains point Z.

15. $\overleftrightarrow{XY}: 3x + 2y = -6, Z(3, 2)$ 16. $\overleftrightarrow{XY}: y = \frac{3}{4}x + 22, Z(12, 8)$ 17. $\overleftrightarrow{XY}: -x + y = 0, Z(-2, -1)$

Write an equation for the line parallel to \overleftrightarrow{XY} that contains point Z.

18. $\overleftrightarrow{XY}: 6x - 10y + 5 = 0, Z(-5, 3)$ 19. $\overleftrightarrow{XY}: y = -1, Z(0, 0)$ 20. $\overleftrightarrow{XY}: x = \frac{1}{2}y + 1, Z(1, -2)$

21. **Aviation** Two planes are flying side by side at the same altitude. It is important that their paths do not intersect. One plane is flying along the path given by the line $4x - 2y = 10$. What is the slope-intercept form of the line that must be the path of another plane passing through the point $L(-1, -2)$ so that the planes do not collide? Graph the paths of the two planes.

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Reteaching 3-6

Slopes of Parallel and Perpendicular Lines

OBJECTIVE: Identifying and writing equations for parallel and perpendicular lines

MATERIALS: Graphing paper

Example 1

Write an equation for the line that contains $G(4, -3)$ and is parallel to \overleftrightarrow{EF} : $-\frac{1}{2}x + 2y = 6$. Write another equation for the line that contains G and is perpendicular to \overleftrightarrow{EF} . Graph the three lines.

Step 1 Rewrite in slope-intercept form: $y = \frac{1}{4}x + 3$

Step 2 Use point-slope form to write an equation for each line.

Parallel line: $m = \frac{1}{4}$

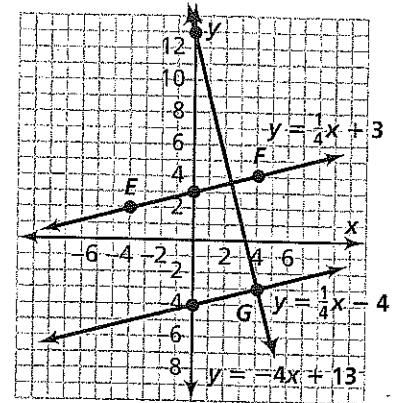
$$y - (-3) = \frac{1}{4}(x - 4)$$

$$y = \frac{1}{4}x - 4$$

Perpendicular line: $m = -4$

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

$$y = -4x + 13$$



Example 2

Given points $J(-1, 4)$, $K(2, 3)$, $L(5, 4)$, and $M(0, -3)$, are \overleftrightarrow{JK} and \overleftrightarrow{LM} parallel, perpendicular, or neither?

$-\frac{1}{3} \neq \frac{7}{5}$ Their slopes are not equal, so they are not parallel.

$\frac{1}{3} \cdot \frac{7}{5} \neq -1$ The product of their slopes is not -1 , so they are not perpendicular. neither

Exercises

Find the slope of a line (a) parallel to and (b) perpendicular to each line.

1. $y = -2x$

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

3. $x = -3$

Write an equation for the line that (a) contains G and is parallel to \overleftrightarrow{EF} . Write another equation for the line that (b) contains G and is perpendicular to \overleftrightarrow{EF} . (c) Graph the three lines to check your answers.

4. $\overleftrightarrow{EF} : y = -2x + 5, G(1, 2)$

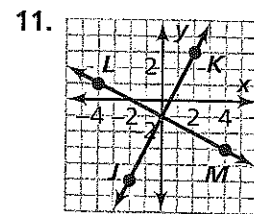
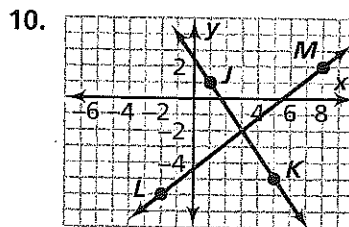
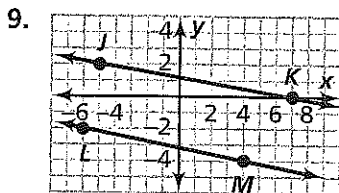
5. $\overleftrightarrow{EF} : 6y + 4x = -12, G(0, -4)$

6. $\overleftrightarrow{EF} : x - \frac{1}{3}y = 4, G(-3, -2)$

Tell whether \overleftrightarrow{JK} and \overleftrightarrow{LM} are parallel, perpendicular, or neither.

7. $J(2, 0), K(-1, 3), L(0, 4), M(-1, 5)$

8. $J(-4, -5), K(5, 1), L(6, 0), M(4, 3)$



12. $\overleftrightarrow{JK} : y = \frac{1}{5}x + 2$
 $\overleftrightarrow{LM} : y = 5x - \frac{1}{2}$

13. $\overleftrightarrow{JK} : 2y + \frac{1}{2}x = -2$
 $\overleftrightarrow{LM} : 2x + 8y = 8$

14. $\overleftrightarrow{JK} : y = -1$
 $\overleftrightarrow{LM} : x = 0$