Reteaching 3-6

Slopes of Parallel and Perpendicular Lines

OBJECTIVE: Identifying and writing equations for parallel and perpendicular lines
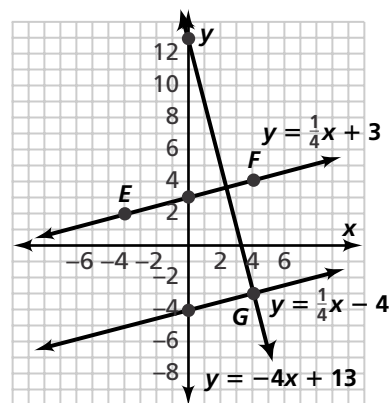
MATERIALS: Graphing paper

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: $m = \frac{1}{4}$	**Perpendicular line:** $m = -4$
$y - (-3) = \frac{1}{4}(x - 4)$	$y - (-3) = -4(x - 4)$
$y = \frac{1}{4}x - 4$	$y = -4x + 13$

Example 2

Given points $J(-1, 4)$, $K(2, 3)$, $L(5, 4)$, and $M(0, -3)$, are $\overleftrightarrow{JK}$ and $\overrightarrow{LM}$ 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. $y = -2x$

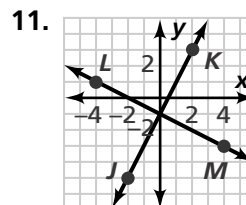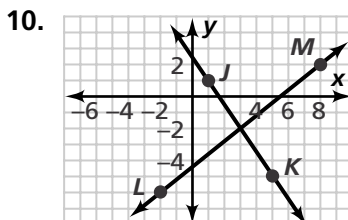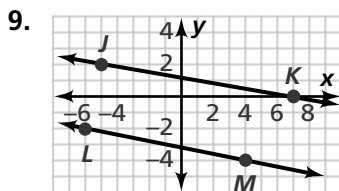**2.** $y = \frac{1}{4}x - 6$

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

9.

10.

11.

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