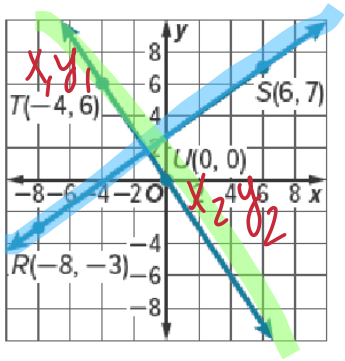
Example 2
Determine Line Relationships When Given Graphs

Determine whether each pair of lines is *parallel*, *perpendicular*, or *neither*.

a. $\overleftrightarrow{RS}$ **and** $\overleftrightarrow{TU}$

b. $\overleftrightarrow{EF}$ **and** $\overleftrightarrow{DG}$



Rise / Run RS $\frac{10}{14} = \frac{5}{7}$ TU $\frac{-6}{4} = -\frac{3}{2}$

neither

EF $-\frac{7}{3}$ DG $\frac{6}{14} = \frac{3}{7}$

perpendicular (negative reciprocal)

$-\frac{7}{3} \cdot \frac{3}{7} = -\frac{21}{21} = -1$ ✓

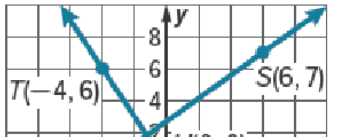
$\frac{y_2 - y_1}{x_2 - x_1}$

$\frac{0 - 6}{0 - -4} = -\frac{6}{4} = -\frac{3}{2}$

Example 2
Determine Line Relationships When Given Graphs

a. $\overleftrightarrow{RS}$ **and** $\overleftrightarrow{TU}$

Step 1 **Find the slope of each line.**

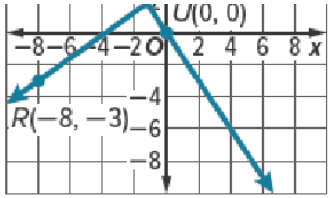


$y_2 - y_1$

slope $= \frac{y_2-y_1}{x_2-x_1}$, where $x_1 \neq x_2$

slope of $\overleftrightarrow{RS} = \frac{7-(-3)}{6-(-8)} = \frac{10}{14}$ or $\frac{5}{7}$

slope of $\overleftrightarrow{TU} = \frac{0-6}{0-(-4)} = -\frac{6}{4}$ or $-\frac{3}{2}$



Example 2
Determine Line Relationships When Given Graphs

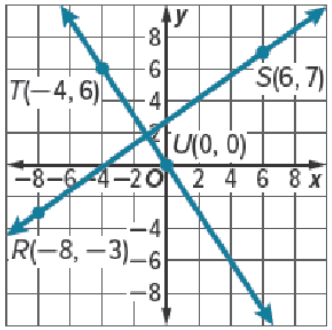
b. $\overleftrightarrow{EF}$ and $\overleftrightarrow{DG}$

Step 1 Find the slope of each line.

slope $= \frac{y_2-y_1}{x_2-x_1}$, where $x_1 \neq x_2$

slope of $\overleftrightarrow{EF} = \frac{-1-6}{6-3} = -\frac{7}{3}$

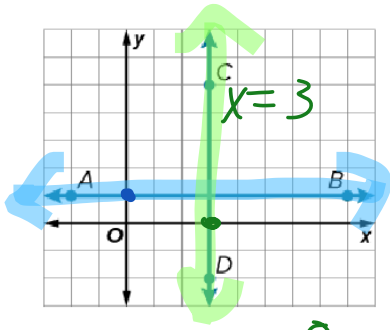
slope of $\overleftrightarrow{DG} = \frac{5-(-1)}{12-(-2)} = \frac{6}{14}$ or $\frac{3}{7}$



Example 2
Determine Line Relationships When Given Graphs

Check

Determine whether the pair of lines is *parallel*, *perpendicular*, or *neither*.



vertical line
$x = x\text{-int}$
Slope undefined $\frac{5}{0}$

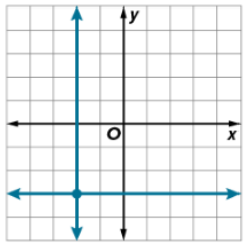
$y = 1$

$y = y\text{-int}$
horizontal line
Slope is $\frac{0}{8} = 0$ 0

Learn

Equations of Lines

The equations of horizontal and vertical lines involve only one variable.

Key Concept: Horizontal and Vertical Line Equations	
The equation of a horizontal line is $y = b$, where b is the y-intercept of the line.	
The equation of a vertical line is $x = a$, where a is the x-intercept of the line.	

When given the equations of two lines, you can compare the equations to determine the relationship between the lines.

Example 3

Determine Line Relationships When Given Equations

Determine whether each pair of lines is *parallel*, *perpendicular*, or *neither*.

a. $y = 3x - 2$; $y - 0 = -\frac{1}{3}(x - 2)$ perpendicular

b. $y = 3$; $x = 1$ perpendicular

c. $y - 5 = -\frac{3}{4}(x + 2)$; $y = -\frac{3}{4}x + 2$ parallel

d. $y = 2x + 3$; $y - 1 = \frac{1}{2}(x + 2)$ neither

e. $x = -2$; $x = 4$ parallel

Example 3

Determine Line Relationships When Given Equations

a. $y = 3x - 2$; $y - 0 = -\frac{1}{3}(x - 2)$

slope-intercept form: $y = 3x - 2$ — slope

point-slope form: $y - 0 = -\frac{1}{3}(x - 2)$ — slope