Module 6 Lesson 3

Try This 5 Possible Solutions

TT 5.a. *Foundations and Pre-calculus Mathematics 10* (Pearson), questions 5, 6, 8.a), 8.b), 9.b), 9.c), and 17 on pages 349 and 350

5. a) The slopes are the same, so the lines are parallel.

b) The slopes are not the same or negative reciprocals of each other, so they are neither parallel nor perpendicular.

c) The slopes are not the same or negative reciprocals of each other, so they are neither parallel nor perpendicular.

d) The slopes are negative reciprocals of each other (multiply to –1), so the lines are perpendicular.

6. a) parallel slope: $-\frac{4}{9}$; perpendicular slope: $\frac{9}{4}$

b) parallel slope: 5; perpendicular slope: $-\frac{1}{5}$

c) parallel slope: $\frac{7}{3}$; perpendicular slope: $-\frac{3}{7}$

d) parallel slope: –4; perpendicular slope: $\frac{1}{4}$

8. a) i) $A(-5, -2)$, $B(1, 5)$ and $C(-1, -4)$, $D(4, 1)$

$$\begin{aligned}\text{slope } AB &= \frac{y_2 - y_1}{x_2 - x_1} \\ &= \frac{5-(-2)}{1-(-5)} \\ &= \frac{7}{6}\end{aligned}$$

$$\begin{aligned}\text{slope } CD &= \frac{y_2 - y_1}{x_2 - x_1} \\ &= \frac{1-(-4)}{4-(-1)} \\ &= \frac{5}{5} \\ &= 1\end{aligned}$$

ii) The slopes are not the same or negative reciprocals of each other, so they are neither parallel nor perpendicular.

b) i) $E(-3, 4)$, $F(3, 2)$ and $G(2, 5)$, $H(0, -1)$

$$\begin{aligned}\text{slope } EF &= \frac{y_2 - y_1}{x_2 - x_1} \\ &= \frac{2-4}{3-(-3)} \\ &= \frac{-2}{6} \\ &= -\frac{1}{3}\end{aligned}$$

$$\begin{aligned}\text{slope } GH &= \frac{y_2 - y_1}{x_2 - x_1} \\ &= \frac{-1-5}{0-2} \\ &= \frac{-6}{-2} \\ &= 3\end{aligned}$$

ii) The slopes are the negative reciprocals, so the lines are perpendicular.

9. Determine the slopes of each line segment. Compare the slopes to determine whether the segments are parallel, perpendicular, or neither.

b) Since the slopes of *BC* and *DE* are equal, the line segments are parallel.

$$\begin{aligned}\text{slope } BC &= \frac{y_2 - y_1}{x_2 - x_1} \\ &= \frac{3 - -2}{-3 - -6} \\ &= \frac{5}{3}\end{aligned}$$

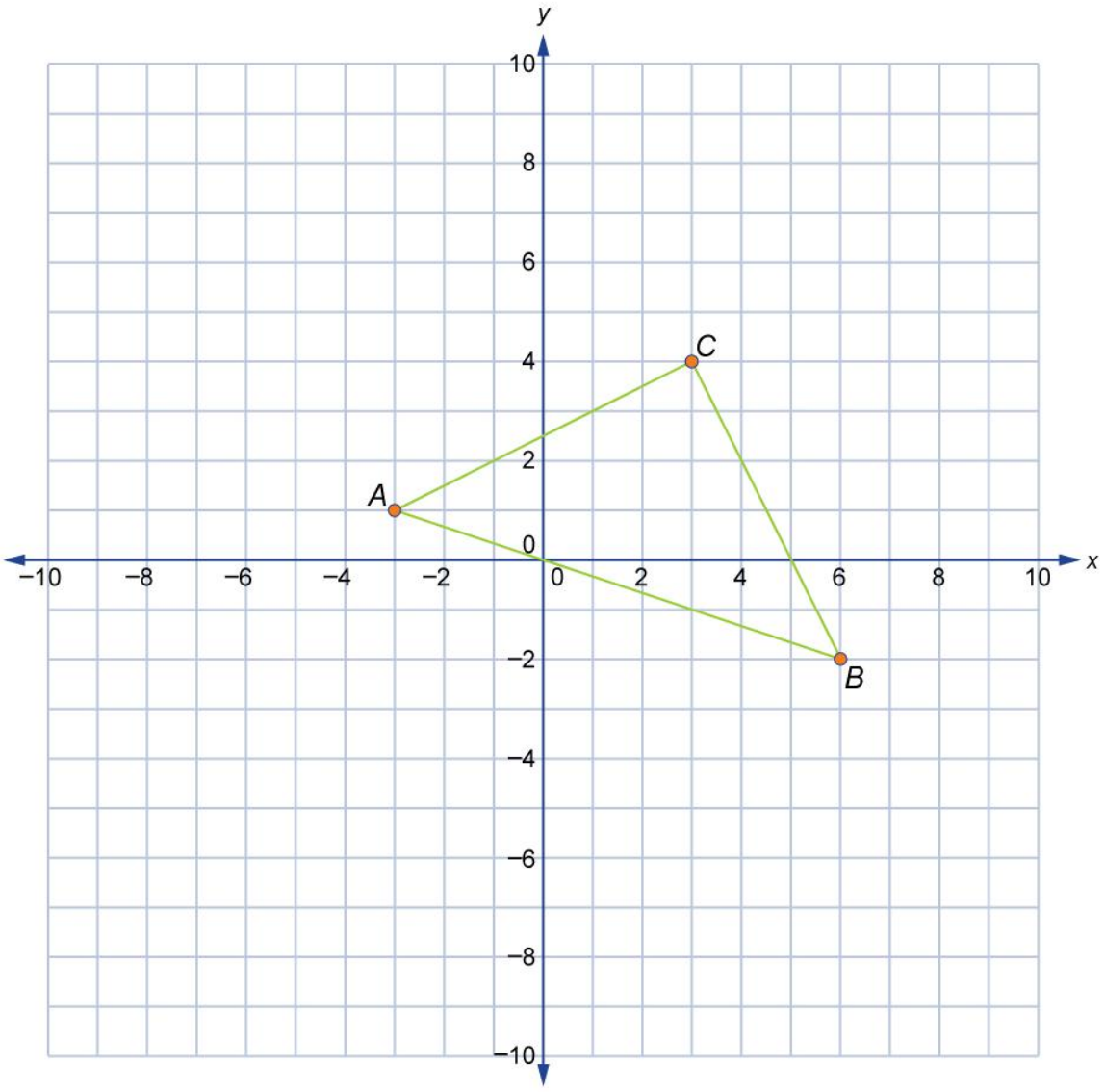
$$\begin{aligned}\text{slope } DE &= \frac{y_2 - y_1}{x_2 - x_1} \\ &= \frac{5-0}{5-2} \\ &= \frac{5}{3}\end{aligned}$$

c) The slopes of *NP* and *QR* are neither equal nor are they negative reciprocals. The segments are neither parallel nor perpendicular.

$$\begin{aligned}\text{slope } NP &= \frac{y_2 - y_1}{x_2 - x_1} \\ &= \frac{-4-2}{-3 - -6} \\ &= \frac{-6}{3} \\ &= -2\end{aligned}$$

$$\begin{aligned}\text{slope } QR &= \frac{y_2 - y_1}{x_2 - x_1} \\ &= \frac{4 - -3}{3-1} \\ &= \frac{7}{2}\end{aligned}$$

17. The following is a possible solution. Sketch the triangle.



Use the graph to determine the slope of each side:

$$\text{slope of } AB = -\frac{3}{9}$$
$$= -\frac{1}{3}$$

$$\text{slope of } BC = -\frac{6}{3}$$
$$= -2$$

$$\text{slope of } AC = \frac{3}{6}$$
$$= \frac{1}{2}$$

Since the slope of *BC* and the slope of *AC* are negative reciprocals, side *BC* and *AC* are perpendicular. Two sides that are perpendicular form a right angle; therefore, $\triangle ABC$ is a right triangle.

TT 5.b. *Foundations and Pre-calculus Mathematics 10* (Pearson), question 21 on page 364

21.

Line	Equation	Slope
A	$y = -5x + 7$	-5
B	$y = 5x + 15$	5
C	$y = \frac{1}{5}x + 9$	$\frac{1}{5}$
D	$y = -\frac{1}{5}x + 15$	$-\frac{1}{5}$
E	$y = \frac{1}{5}x + 21$	$\frac{1}{5}$
F	$y = -5x + 13$	-5
G	$y = 5x + 24$	5
H	$y = -\frac{1}{5}x$	$-\frac{1}{5}$

Lines with identical slopes are parallel. Therefore, *A* is parallel to *F*, *B* is parallel to *G*, *C* is parallel to *E*, and *D* is parallel to *H*.

Lines whose slopes are negative reciprocals are perpendicular. Therefore, *A* and *F* are both perpendicular to *C* and *E*; *B* and *G* are both perpendicular to *D* and *H*.