Parallel & Perpendicular Lines Assignment

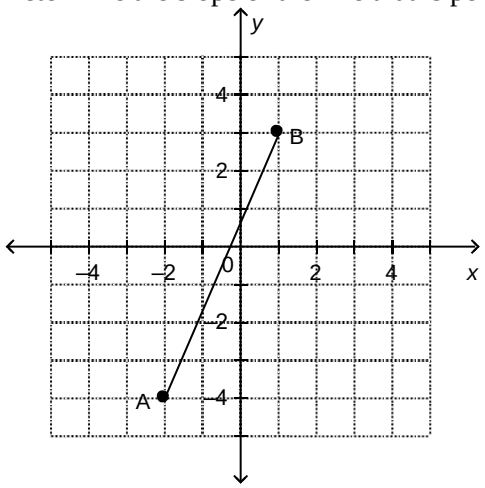
Multiple Choice
Identify the choice that best completes the statement or answers the question.

____ 1. A line passes through J(–12, 5) and K(2, –10). Determine the coordinates of L so that line JL is perpendicular to line JK.
a. L(19, 3)
b. L(–15, 14)
c. L(14, –15)
d. L(3, 19)

____ 2. A line passes through R(12, 3) and F(–7, –7). Determine the coordinates of two points on a line perpendicular to RF.
a. (24, –13) and (34, 6)
b. (6, 24) and (34, –13)
c. (24, 6) and (34, –13)
d. (24, 6) and (–13, 34)

Short Answer

3. Determine the slope of the line that is perpendicular to this line segment.



4. Determine the slope of a line that is perpendicular to the line through W(–10, 0) and X(11, –9).

5. Determine the slope of a line that is parallel to the line through L(–10, 0) and K(11, –12).

6. A line has *x*-intercept –6 and *y*-intercept 9. Determine the slope of a line parallel to this line.

7. The coordinates of the endpoints of segments are given below. Are the two line segments parallel, perpendicular, or neither?
a) R(–4, 16), S(–24, –8) and T(3, –1), U(9, 4)
b) F(–7, –8), G(–4, 1) and V(–8, 20), W(28, 8)

Problem

8. A line passes through R(4, 6) and K(–4, 10).
a) What is the slope of line RK?

b) Line VB is parallel to RK. What is the slope of VB? Explain your answer.
c) Line WX is perpendicular to RK. What is the slope of WX? Explain your answer.

9. The coordinates of the vertices of ΔGBW are G(16, 8), B(–28, 16), and W(4, –8). Is ΔGBW a right triangle? Justify your answer.

10. Given A(30, 15), B(10, 45), and C(10, 15), determine the coordinates of point D such that CD is parallel to AB and D is on the:
    i) *y*-axis
    ii) *x*-axis

Parallel & Perpendicular Lnes Assignment
Answer Section

MULTIPLE CHOICE

1. ANS: D
2. ANS: C

SHORT ANSWER

3. ANS:
   $-\frac{3}{7}$

4. ANS:
   $\frac{7}{3}$

5. ANS:
   $-\frac{4}{7}$

6. ANS:
   $\frac{3}{2}$

7. ANS:
   a) Neither
   b) Perpendicular

PROBLEM

8. ANS:
   a) Determine the slope of RK.

   Slope of RK = $\frac{y_2 - y_1}{x_2 - x_1}$

   Slope of RK = $\frac{10 - 6}{-4 - 4}$

   Slope of RK = $\frac{4}{-8}$

   Slope of RK = $-\frac{1}{2}$

   The slope of line RK is $-\frac{1}{2}$.

b) The slope of a line parallel to RK has the same slope as RK, which is $-\frac{1}{2}$.

The slope of VB is $-\frac{1}{2}$.

c) The slope of a line perpendicular to RK is the negative reciprocal of $-\frac{1}{2}$, which is 2.

The slope of WX is 2.

9. ANS:

A right triangle has two sides that are perpendicular.

To check whether ΔGBW is a right triangle, determine whether two sides are perpendicular.

Slope of GB = $\frac{y_2 - y_1}{x_2 - x_1}$

Slope of GB = $\frac{16 - 8}{-28 - 16}$

Slope of GB = $\frac{8}{-44}$

The slope of GB is $-\frac{2}{11}$.

Slope of BW = $\frac{y_2 - y_1}{x_2 - x_1}$

Slope of BW = $\frac{-8 - 16}{4 - (-28)}$

Slope of BW = $\frac{-24}{32}$

The slope of BW is $-\frac{3}{4}$.

Slope of GW = $\frac{y_2 - y_1}{x_2 - x_1}$

Slope of GW = $\frac{-8 - 8}{4 - 16}$

Slope of GW = $\frac{-16}{-12}$

The slope of GW is $\frac{4}{3}$.

Since the slopes of BW and GW are negative reciprocals, BW and GW are perpendicular.

This means that ∠BWG is a right angle and that ΔGBW is a right triangle.

10. ANS:

Slope of AB = $\frac{y_2 - y_1}{x_2 - x_1}$

Slope of AB = $\frac{45-15}{10-30}$

Slope of AB = $\frac{30}{-20}$

The slope of AB is $-\frac{3}{2}$.

Since CD is parallel to AB, the slopes of CD and AB are equal.

So, the slope of CD is $-\frac{3}{2}$.

i) Point D is on the *y*-axis. So, it has coordinates (0, *y*).
Use the formula for the slope of a line:

Slope of CD = $\frac{y_2-y_1}{x_2-x_1}$

$$-\frac{3}{2} = \frac{y-15}{0-10}$$

$$-\frac{3}{2} = \frac{y-15}{-10}$$

$$(-10)(-\frac{3}{2}) = (-10)\left(\frac{y-15}{-10}\right)$$

$$15 = y-15$$

$$30 = y$$

The coordinates of point D are (0, 30).

ii) Point D is on the *x*-axis. It has coordinates (*x*, 0).
Use the formula for the slope of a line:

Slope of CD = $\frac{y_2-y_1}{x_2-x_1}$

$$-\frac{3}{2} = \frac{0-15}{x-10}$$

$$-\frac{3}{2} = \frac{-15}{x-10}$$

$$(x-10)(-\frac{3}{2}) = (x-10)\left(\frac{-15}{x-10}\right)$$

$$\frac{-3x+30}{2} = -15$$

$$(2)\left(\frac{-3x+30}{2}\right) = (2)(-15)$$

$$-3x+30 = -30$$

$$-3x = -60$$

$$x = 20$$

The coordinates of point D are (20, 0).