

G.G.63: Parallel and Perpendicular Lines: Determine whether two lines are parallel, perpendicular, or neither, given their equations

- 1 What is the equation of a line that is parallel to the line whose equation is $y = x + 2$?
 - 1) $x + y = 5$
 - 2) $2x + y = -2$
 - 3) $y - x = -1$
 - 4) $y - 2x = 3$
- 2 Which equation represents a line that is parallel to the line whose equation is $3x - 2y = 7$?
 - 1) $y = -\frac{3}{2}x + 5$
 - 2) $y = -\frac{2}{3}x + 4$
 - 3) $y = \frac{3}{2}x - 5$
 - 4) $y = \frac{2}{3}x - 4$
- 3 Which equation represents a line parallel to the line whose equation is $2y - 5x = 10$?
 - 1) $5y - 2x = 25$
 - 2) $5y + 2x = 10$
 - 3) $4y - 10x = 12$
 - 4) $2y + 10x = 8$
- 4 Which equation represents a line perpendicular to the line whose equation is $2x + 3y = 12$?
 - 1) $6y = -4x + 12$
 - 2) $2y = 3x + 6$
 - 3) $2y = -3x + 6$
 - 4) $3y = -2x + 12$
- 5 Which equation represents a line that is perpendicular to the line whose equation is $-2y = 3x + 7$?
 - 1) $y = x + 7$
 - 2) $2y = 3x - 3$
 - 3) $y = \frac{2}{3}x - 3$
 - 4) $y = \frac{3}{2}x - 3$
- 6 Which line is perpendicular to the line whose equation is $5y + 6 = -3x$?
 - 1) $y = -\frac{5}{3}x + 7$
 - 2) $y = \frac{5}{3}x + 7$
 - 3) $y = -\frac{3}{5}x + 7$
 - 4) $y = \frac{3}{5}x + 7$
- 7 Which statement describes the lines whose equations are $y = \frac{1}{3}x + 12$ and $6y = 2x + 6$?
 - 1) They are segments.
 - 2) They are perpendicular to each other.
 - 3) They intersect each other.
 - 4) They are parallel to each other.
- 8 The lines represented by the equations $y + \frac{1}{2}x = 4$ and $3x + 6y = 12$ are
 - 1) the same line
 - 2) parallel
 - 3) perpendicular
 - 4) neither parallel nor perpendicular
- 9 The lines $3y + 1 = 6x + 4$ and $2y + 1 = x - 9$ are
 - 1) parallel
 - 2) perpendicular
 - 3) the same line
 - 4) neither parallel nor perpendicular
- 10 The equation of line k is $y = \frac{1}{3}x - 2$. The equation of line m is $-2x + 6y = 18$. Lines k and m are
 - 1) parallel
 - 2) perpendicular
 - 3) the same line
 - 4) neither parallel nor perpendicular
- 11 The lines represented by the equations $4x + 6y = 6$ and $y = \frac{2}{3}x - 1$ are
 - 1) parallel
 - 2) the same line
 - 3) perpendicular
 - 4) intersecting, but *not* perpendicular

- 12 A student wrote the following equations:

$$3y + 6 = 2x$$

$$2y - 3x = 6$$

The lines represented by these equations are

- 1) parallel
 - 2) the same line
 - 3) perpendicular
 - 4) intersecting, but *not* perpendicular
- 13 The two lines represented by the equations below are graphed on a coordinate plane.

$$x + 6y = 12$$

$$3(x - 2) = -y - 4$$

Which statement best describes the two lines?

- 1) The lines are parallel.
 - 2) The lines are the same line.
 - 3) The lines are perpendicular.
 - 4) The lines intersect at an angle other than 90° .
- 14 The equations of lines k , p , and m are given below:

$$k: x + 2y = 6$$

$$p: 6x + 3y = 12$$

$$m: -x + 2y = 10$$

Which statement is true?

- 1) $p \perp m$
 - 2) $m \perp k$
 - 3) $k \parallel p$
 - 4) $m \parallel k$
- 15 The equations of lines k , m , and n are given below.

$$k: 3y + 6 = 2x$$

$$m: 3y + 2x + 6 = 0$$

$$n: 2y = 3x + 6$$

Which statement is true?

- 1) $k \parallel m$
 - 2) $n \parallel m$
 - 3) $m \perp k$
 - 4) $m \perp n$
- 16 Two lines are represented by the equations $-\frac{1}{2}y = 6x + 10$ and $y = mx$. For which value of m will the lines be parallel?
- 1) -12
 - 2) -3
 - 3) 3
 - 4) 12

- 17 Determine whether the two lines represented by the equations $y = 2x + 3$ and $2y + x = 6$ are parallel, perpendicular, or neither. Justify your response.

- 18 Two lines are represented by the equations $x + 2y = 4$ and $4y - 2x = 12$. Determine whether these lines are parallel, perpendicular, or neither. Justify your answer.

- 19 State whether the lines represented by the equations $y = \frac{1}{2}x - 1$ and $y + 4 = -\frac{1}{2}(x - 2)$ are parallel, perpendicular, or neither. Explain your answer.

- 20 Given two lines whose equations are $3x + y - 8 = 0$ and $-2x + by + 9 = 0$, determine the value of b such that the two lines will be perpendicular.

- 21 Points $A(5, 3)$ and $B(7, 6)$ lie on \overleftrightarrow{AB} . Points $C(6, 4)$ and $D(9, 0)$ lie on \overleftrightarrow{CD} . Which statement is true?

1) $\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$

2) $\overleftrightarrow{AB} \perp \overleftrightarrow{CD}$

3) \overleftrightarrow{AB} and \overleftrightarrow{CD} are the same line.

4) \overleftrightarrow{AB} and \overleftrightarrow{CD} intersect, but are not perpendicular.

G.G.63: Parallel and Perpendicular Lines: Determine whether two lines are parallel, perpendicular, or neither, given their equations

Answer Section

1 ANS: 3 REF: 080909ge

2 ANS: 3

$$m = \frac{-A}{B} = \frac{-3}{-2} = \frac{3}{2}$$

REF: 011324ge

3 ANS: 3 REF: 011014ge

4 ANS: 2 REF: 060926ge

5 ANS: 3 REF: 060528a

6 ANS: 2 REF: 080630a

7 ANS: 4 REF: 060722a

8 ANS: 2

$$y + \frac{1}{2}x = 4 \quad 3x + 6y = 12$$

$$y = -\frac{1}{2}x + 4 \quad 6y = -3x + 12$$

$$m = -\frac{1}{2} \quad y = -\frac{3}{6}x + 2$$

$$m = -\frac{1}{2} \quad y = -\frac{1}{2}x + 2$$

REF: 081014ge

9 ANS: 4 REF: fall0822ge

10 ANS: 1 REF: 061113ge

11 ANS: 4

$$m = \frac{-A}{B} = \frac{-4}{6} = -\frac{2}{3}$$

REF: 011520ge

12 ANS: 4

$$3y + 6 = 2x \quad 2y - 3x = 6$$

$$3y = 2x - 6 \quad 2y = 3x + 6$$

$$y = \frac{2}{3}x - 2 \quad y = \frac{3}{2}x + 3$$

$$m = \frac{2}{3} \quad m = \frac{3}{2}$$

REF: 081315ge

13 ANS: 4

$$x + 6y = 12 \qquad 3(x - 2) = -y - 4$$

$$6y = -x + 12 \qquad -3(x - 2) = y + 4$$

$$y = -\frac{1}{6}x + 2 \qquad m = -3$$

$$m = -\frac{1}{6}$$

REF: 011119ge

14 ANS: 1

$$k: \frac{-A}{B} = \frac{-1}{2} \quad p: \frac{-A}{B} = \frac{-6}{3} = -2 \quad m: \frac{-A}{B} = \frac{-(-1)}{2} = \frac{1}{2}$$

REF: 081426ge

15 ANS: 4

$$k: m = \frac{2}{3} \quad m: m = \frac{-A}{B} = \frac{-2}{3} \quad n: m = \frac{3}{2}$$

REF: 061518ge

16 ANS: 1

$$-2 \left(-\frac{1}{2}y = 6x + 10 \right)$$

$$y = -12x - 20$$

REF: 061027ge

17 ANS:

The slope of $y = 2x + 3$ is 2. The slope of $2y + x = 6$ is $\frac{-A}{B} = \frac{-1}{2}$. Since the slopes are opposite reciprocals, the lines are perpendicular.

REF: 011231ge

18 ANS:

The slope of $x + 2y = 4$ is $m = \frac{-A}{B} = \frac{-1}{2}$. The slope of $4y - 2x = 12$ is $\frac{-A}{B} = \frac{2}{4} = \frac{1}{2}$. Since the slopes are neither equal nor opposite reciprocals, the lines are neither parallel nor perpendicular.

REF: 061231ge

19 ANS:

Neither. The slope of $y = \frac{1}{2}x - 1$ is $\frac{1}{2}$. The slope of $y + 4 = -\frac{1}{2}(x - 2)$ is $-\frac{1}{2}$. The slopes are neither the same nor opposite reciprocals.

REF: 011433ge

20 ANS:

6

REF: fall9925b

21 ANS: 4

$$m_{AB}^{\leftrightarrow} = \frac{6-3}{7-5} = \frac{3}{2}. \quad m_{CD}^{\leftrightarrow} = \frac{4-0}{6-9} = \frac{4}{-3}$$

REF: 061318ge