

**Geometry**  
**Parallel & Perpendicular Lines**

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**WARM-UP: What do you remember about slope?**

**Slope intercept form:**  $y = mx + b$  \*remember: **m** is the slope and **b** is the y-intercept

What is the slope of the following equations? (you might need to solve for y first!)

a.  $y = 4x + 3$

b.  $y + 3x = 4$

c.  $2y - 5x = 12$

**Slope between two points: Slope formula:**  $m = \frac{y_2 - y_1}{x_2 - x_1}$

\*remember: when you divide by 0, the slope is \_\_\_\_\_

Find the slope between the following points:

a. (3, 5) (6, 9)

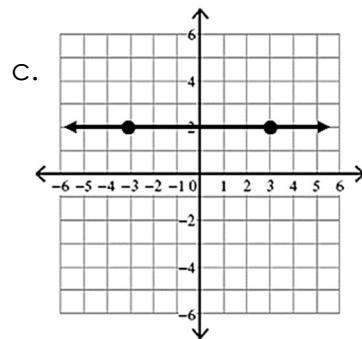
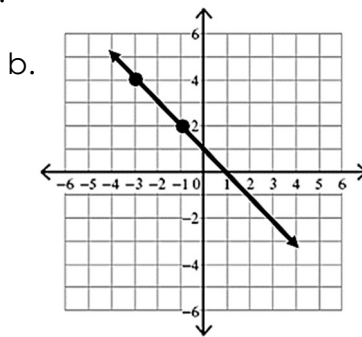
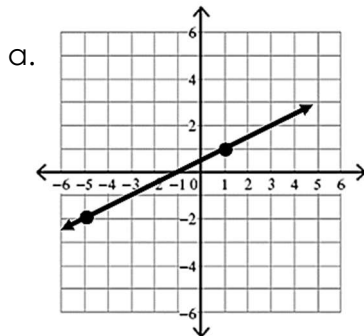
b. (-3, 4) (2, 8)

c. (7, 5) (7, -1)

**Slope on a graph: Slope:**  $\frac{\Delta y}{\Delta x}$  or  $\frac{\text{rise}}{\text{run}}$

\*ALWAYS count from \_\_\_\_\_ to \_\_\_\_\_. ("Run" should be positive)

Find the slope from the following graphs:



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## Parallel Lines

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- **Graphs:**

- Lines \_\_\_\_\_ intersect and are in the \_\_\_\_\_ plane.

- **Equations:**

- \_\_\_\_\_ slopes

- \_\_\_\_\_ y - intercepts

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Are these lines parallel?

1.  $y = -2x + 1$  and  $y = -2x - 4$

2.  $y = 3x - 4$  and  $-x + 3y = 9$

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### Writing an Equation of a Line PARALLEL to another and given a point.

A. Given equation should be solved for  $y$  ( $y = mx + b$ ).

B. Write down the slope of that line.

C. Substitute  $m$  and  $(x, y)$  in  $y = mx + b$ . Solve for  $b$ .

D. Write the equation using the slope and  $y$ -intercept.

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3. Write a line parallel to the line  $2x + y = 3$  and passes through the point  $(-2, 5)$ .

4. Write a line parallel to the line  $y = 3x - 5$  and passes through the point  $(-5, -2)$ .

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5. Write a line parallel to the line  $y = -4x + 1$  and passes through the point  $(2, -1)$ .

6. Write a line parallel to the line  $y = -x - 7$  and passes through the point  $(-4, -4)$ .

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## Perpendicular Lines

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- Graphs:
  - Lines intersect at a \_\_\_\_\_ angle.
- Equations:
  - \_\_\_\_\_ slopes
  - \_\_\_\_\_ y - intercepts

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### Writing an Equation of a Line PERPENDICULAR to another and given a point.

- Given equation should be solved for y. ( $y = mx + b$ ).
- Write down the perpendicular slope of that line.
- Substitute the new slope and  $(x, y)$  in  $y = mx + b$ . Solve for b.
- Write the equation using m and b.

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7. Write a line perpendicular to the line  $y = \frac{1}{2}x - 2$  and passes through the point  $(1, 0)$ .

8. Write a line perpendicular to the line  $y = -3x + 2$  and passes through the point  $(6, 5)$ .

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9. Write a line perpendicular to the line  $2x + 3y = 9$  and passes through the point  $(6, -1)$ .

10. Write a line perpendicular to the line  $y = 2x - 1$  and passes through the point  $(2, 4)$ .

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**Parallel Lines**

- Parallel lines have the \_\_\_\_\_ slope.
- Parallel lines \_\_\_\_\_ intersect.
- Symbol for parallel  $\rightarrow$  \_\_\_\_\_
- Horizontal lines are \_\_\_\_\_ to each other.
- Vertical lines are \_\_\_\_\_ to each other.

**Perpendicular Lines**

- Perpendicular lines have \_\_\_\_\_ slopes.
- Perpendicular lines intersect at \_\_\_\_\_ angles.
- Symbol for perpendicular  $\rightarrow$  \_\_\_\_\_
- Horizontal and \_\_\_\_\_ lines are always perpendicular to each other.

Decide whether the following lines are parallel, perpendicular, or neither.

1. Line  $p$  contains points  $(-3, -1)$  &  $(-5, -2)$   
Line  $b$  contains points  $(-4, -1)$  &  $(12, -9)$

2.  $3x + y = 11$   
 $2x - 6y = -18$

$$m_{\text{line } p} = \underline{\hspace{2cm}}$$

$$m_{\text{line } b} = \underline{\hspace{2cm}}$$

$$m_{\text{line } j} = \underline{\hspace{2cm}}$$

$$m_{\text{line } s} = \underline{\hspace{2cm}}$$

Circle: **PARALLEL** **PERPENDICULAR** **NEITHER**

Circle: **PARALLEL** **PERPENDICULAR** **NEITHER**

Find the slope of a line parallel and perpendicular to the given line.

3.  $y = 6$

$$m_{\parallel} = \underline{\hspace{2cm}}$$

$$m_{\perp} = \underline{\hspace{2cm}}$$

4.  $3y = 2x - 24$

$$m_{\parallel} = \underline{\hspace{2cm}}$$

$$m_{\perp} = \underline{\hspace{2cm}}$$

Write the slope-intercept equation for a line **PARALLEL** to the given line and contains the given point.

5.  $y = 3x - 4$   
Contains the point  $(-3, 8)$

6.  $y = -1/2 x + 8$   
Contains the point  $(4, -6)$

Write the slope-intercept equation for a line **PERPENDICULAR** to the given line and contains the point.

7.  $y = -1/5 x + 6$   
Contains the point  $(4, 8)$

8.  $y = 2x - 5$   
Contains the point  $(-8, 2)$