Section 11.R.4 Slope-Intercept Form

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The Meaning of Slope

For a line, the _____ is called the **slope of the line**.

Calculating the Slope

Slope

Let $P_1(x_1, y_1)$ and $P_2(x_2, y_2)$ be two points on a line. The slope can be calculated as follows.

slope = _____

Note: _____ is standard notation for representing the slope of a line.

Positive and Negative Slope

Lines with positive slope go _____

Lines with negative slope go _____

Example 1 Finding the Slope of a Line

Find the slope of the line that contains the points $(-1, 2)$ and $(3, 5)$, and then graph the line.

Solution

Exercises

Find the slope of the line determined by each pair of points.

1. $(2, 4); (1, -1)$

2. $(-6, 3); (1, 2)$

3. $(-5, 8); (3, 8)$

4. $(0, 0); (-2, -3)$

5. $\left(\frac{3}{4}, \frac{3}{2}\right); (1, 2)$

6. $\left(\frac{3}{2}, \frac{4}{5}\right); \left(-2, \frac{1}{10}\right)$

Slopes of Horizontal and Vertical Lines

Horizontal and Vertical Lines

The following two general statements are true for horizontal and vertical lines.

1. For horizontal lines (of the form _____
2. For vertical lines (of the form _____

Example 3 Finding the Slope of a Horizontal Line

Find the equation and slope of the horizontal line through the point $(-2, 5)$.

Solution

Exercises

Determine whether each equation represents a horizontal line or vertical line and give its slope. Graph the line.

7. $y = -2$

8. $x = 1.7$

9. $3y = -18$

10. $2y + 5 = 0$

Slope-Intercept Form

Slope-Intercept Form

_____ is called the slope-intercept form for the equation of a line, where m is the slope and $(0, b)$ is the y-intercept.

Example 5 Using Slope and the y-Intercept to Graph a Line

Find the slope and y-intercept of $-2x + 3y = 6,$ and graph the line.

Solution

Exercises

Write each equation in slope-intercept form. Find the slope and *y*-intercept, and then use them to draw the graph.

11. $y = 3x - 4$

12. $4x + y = 0$

13. $4x + y + 3 = 0$

14. $4x = 3y - 7$

15. $5x - 2y + 5 = 0$

16. $6x + 5y = -15$

Finding Equations of Lines Given the Slope and the *y*-Intercept

Example 7 Finding Equations Given the Slope and the *y*-Intercept

Find the equation of the line through the point $(0, -2)$ with slope $\frac{1}{2}$.

Solution

Exercises

Find an equation in slope-intercept form for the line passing through the given point with the given slope.

17. $(0, 2); m = \frac{1}{3}$

18. $(0, -5); m = 4$

19. $(0, 9); m = -1$

20. $(0, -1); m = -\frac{3}{2}$