

The slide features a light beige background with a blue grid pattern in the top-left and bottom-right corners. A dark blue rectangular area is positioned on the left side, containing the text. A vertical red bar is located on the far left edge of the slide.

Algebra 1

Chapter 5
Section 5-6

Vocabulary

Parallel Lines Lines in the same plane that never intersect

Perpendicular Lines Lines that intersect to form right angles (90°)

Opposite Reciprocal Two numbers that multiply to -1 .
**Numbers flipped with opposite sign

ex: $\frac{2}{3}$ and $-\frac{3}{2}$
 -5 and $\frac{1}{5}$

Slopes of Parallel Lines

Key Concept Slopes of Parallel Lines

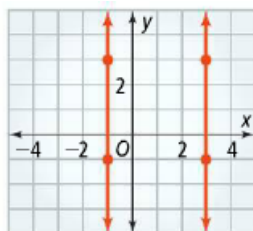
Words

Nonvertical lines are parallel if they have the same slope and different y -intercepts. Vertical lines are parallel if they have different x -intercepts.

Example

The graphs of $y = \frac{1}{2}x + 1$ and $y = \frac{1}{2}x - 2$ are lines that have the same slope, $\frac{1}{2}$, and different y -intercepts. The lines are parallel.

Graph



Slopes of Perpendicular Lines

Key Concept Slopes of Perpendicular Lines

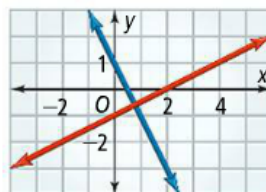
Words

Two nonvertical lines are perpendicular if the product of their slopes is -1 . A vertical line and a horizontal line are also perpendicular.

Example

The graph of $y = \frac{1}{2}x - 1$ has a slope of $\frac{1}{2}$.
The graph of $y = -2x + 1$ has a slope of -2 .
Since $\frac{1}{2}(-2) = -1$, the lines are perpendicular.

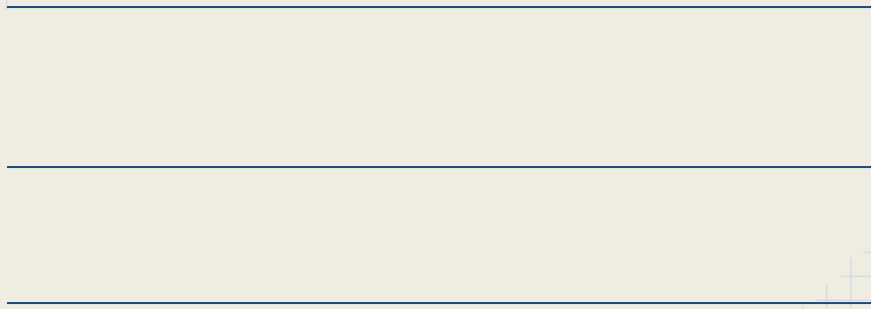
Graph



Are Two Lines Parallel, Perpendicular, or Neither?

$$y = 4x - 3$$

$$y = 2x + 3$$



Neither

Parallel

Neither

Perpendicular

Find the Equation of a Parallel Line

Find the slope-intercept equation of a line that is parallel to the given line and passes through the given point:

$$y = 9x - 3; (1, 7)$$

$$-10x + 2y = 20; (9, 0)$$

$$y = \frac{1}{3}x - 1; (-3, -3)$$

$$y - 5 = 10x; (1.5, 15)$$

Use the point slope: $y - y_1 = m(x - x_1)$

$$y = 9x - 2$$

$$y = 5x - 45$$

$$y = \frac{1}{3}x - 2$$

$$y = 10x$$

Find the Equation of a Parallel Line

Find the slope-intercept equation of a line that is perpendicular to the given line and passes through the given point:

$$y = -3x - 3; (3, -1)$$

$$x + y = 0; (-4, 4)$$

$$y = \frac{5}{2}x - 17; (5, 0)$$

$$3x - 6y = 7; (-2.5, 4)$$

Use the point slope: $y - y_1 = m(x - x_1)$

$$y = \frac{1}{3}x - 2$$

$$y = x + 8$$

$$y = -\frac{2}{5}x + 2$$

$$y = -2x - 1$$