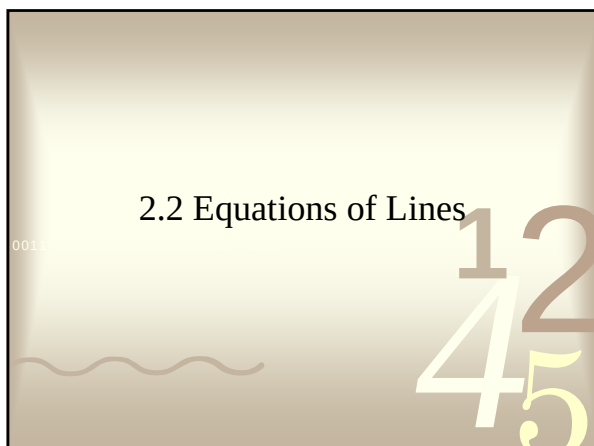


2.2 Equations of Lines

001



Point-Slope Form of a Line

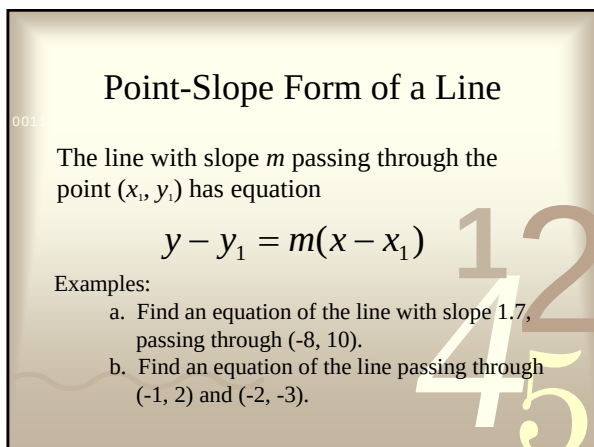
001

The line with slope m passing through the point (x_1, y_1) has equation

$$y - y_1 = m(x - x_1)$$

Examples:

- Find an equation of the line with slope 1.7, passing through $(-8, 10)$.
- Find an equation of the line passing through $(-1, 2)$ and $(-2, -3)$.



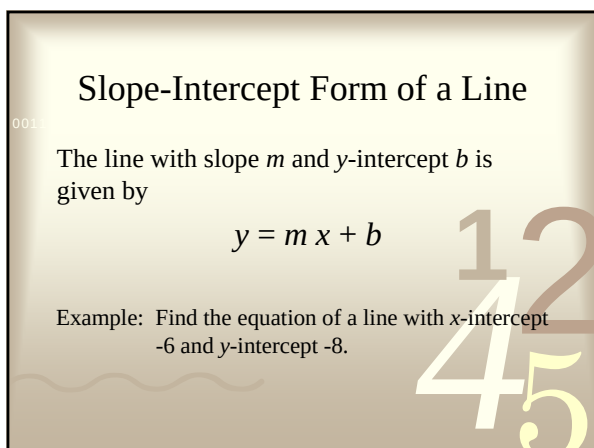
Slope-Intercept Form of a Line

001

The line with slope m and y-intercept b is given by

$$y = m x + b$$

Example: Find the equation of a line with x-intercept -6 and y-intercept -8 .



Finding x - and y -intercepts

- To find the x -intercept, let $y = 0$ and solve for x .
- To find the y -intercept, let $x = 0$ and solve for y .

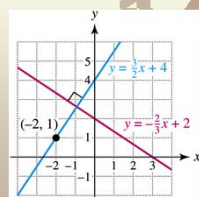
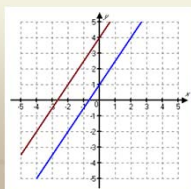
Example: Find the x - and y -intercepts of $5x + 2y = -20$. Sketch the graph.

Horizontal & Vertical Lines

- The equation of a horizontal line is $y = c$.
- Horizontal lines have zero slope.
- The equation of a vertical line is $x = c$.
- Vertical lines have undefined slope.
- Example: Find an equation of the vertical line passing through $(1.95, 10.7)$

Parallel and Perpendicular Lines

- Parallel lines have the same slope.
- Perpendicular lines have slopes which are negative reciprocals (unless one line is vertical)



From *Precalculus with Modeling and Visualization* 3rd ed. by Rockswold, 2006, p.93

Examples

- Find an equation of the line parallel to the line $y = -4x - 12$, passing through $(2, -5)$.
- Find an equation of the line perpendicular to $x = 15$, passing through $(1.6, -9.5)$.
- Find an equation of the line passing through $(2, 8)$ and perpendicular to the line passing through $(-3, -5)$ and $(-4, 0)$.
