

## Review of Chapter 2      2.1 Functions

### GOALS:

1. Consider equations in 2 variables.

$$f(x) = 3x + 7 \quad x^2 + y^2 = 25 \quad f(x) = x^3 - x + 1$$

2. Understand the definition of a function.

Function: set of ordered pairs  $(x, y)$ , in which each value of  $x$  results in **EXACTLY** one value of  $y$ .  $y = x^2$  IS function

Vertical Line Test  $x^2 + y^2 = 25$  NOT function

3. Understand the role of a place-holder in evaluating a function.

$$f(x) = 3x + 7 \\ f(\quad) = 3(\quad) + 7$$

4. Evaluate functions for both numerical values and algebraic expressions.

$$f(-4) = 3(-4) + 7 = -5 \quad f(x+1) = 3(x+1) + 7 = 3x + 10$$

5. Determine the domain and range of functions.

Domain: **all values of  $x$**  that result in a real number for  $y$

$y = x^2$   
D: all real numbers

Range: **all of the possible values of  $y$**

R:  $y \geq 0$

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## 2.3 Linear Functions and Slope

### GOALS:

1. Understand the concept of slope for linear equations.

$$m = \frac{\text{vertical change}}{\text{horizontal change}} = \frac{\text{rise}}{\text{run}} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{\Delta y}{\Delta x}$$

2. Find the slope of a line through 2 given points.

Find the slope of the line through the points  $(-3, -2)$  and  $(3, 8)$ .

Is the line increasing, decreasing, horizontal, or vertical?

$$m = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{8 - (-2)}{3 - (-3)} = \frac{10}{6} = \frac{5}{3} > 0 \quad \therefore \text{line increasing}$$

3. Find the linear equation given:

- the slope of the line and the y-intercept G:  $m = 2$ ,  $(0, 1)$
- the slope of the line and any point G:  $m = 2$ ,  $(1, 0)$
- two points on the line G:  $(-2, -4)$ ,  $(1, -1)$

4. Understand how the slope of a line relates to increasing, decreasing, vertical and horizontal lines.

If  $m > 0$ , then **increasing**      If  $m < 0$ , then **decreasing**

If  $m = 0$ , then **horizontal**      If  $m$  DNE, then **vertical**

5. Recognize different forms of a linear equation:

- slope-intercept form:  $y = mx + b$
- point-slope form:  $y - y_1 = m(x - x_1)$
- vertical line:  $x = c$  and horizontal line:  $y = k$

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## Review of Chapter 2      2.4 More on Slopes

### GOALS:

#### 1. Understand parallel lines:

- 2 lines that never intersect  $y = 2x + 4$
- slopes are equal  $m_1 = m_2$   $y = 2x - 3$

#### 2. Understand perpendicular Lines:

- 2 lines that intersect at  $90^\circ$  angles  $y = 2x + 4$
- slopes are negative reciprocals  $y = (-1/2)x + 4$

$$m_1 = \frac{-1}{m_2} \quad \text{OR:} \quad m_1 m_2 = -1$$

#### 3. Find equations of parallel and perpendicular lines.

G:  $(-2, -7)$ , parallel to  $y = -5x + 4$

$$y = -5x - 7$$

G:  $(5, -9)$ , perpendicular to  $x + 7y - 12 = 0$

$$y = -\frac{1}{7}x - \frac{44}{7}$$

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Attachments

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slope\_intercept.mp4