Summary Chapter 3: Graphs and Functions

Intermediate Algebra from OpenStax, a free and open online textbook

Section 1:
Terminology
- Linear equation in two variables
- Rectangular coordinate system
- x-axis and y-axis
- Ordered Pair
- Independent Variable
- Dependent Variable
- Table of Values
- x-intercept and y-intercept

Be Able To
- Determine if given ordered pairs are solutions of linear equations in two variables
- Plot ordered pairs
- Create a table of values from an algebraic equation
- Complete table of values for linear equations in two variables
- Graph linear equation by plotting points
- Graph vertical and horizontal lines
- Find the x-intercept and y-intercept
- Apply the concepts

Section 2:
Terminology
- Slope
- Parallel lines
- Perpendicular lines

Be Able To
- Find the slope of a line
- Find the slope given two points
- Graph a line given a point and the slope
- Graph a line using the slope and y-intercept
- Apply the concepts

Be able to use the formula
- Slope of a line containing the points \((x_1, y_1)\) and \((x_2, y_2)\): \(m = \frac{y_2 - y_1}{x_2 - x_1}\)

Section 3:
Terminology
- Slope-intercept form of an equation of a straight line
- The point-slope form of an equation of a straight line

Be Able To
- Find the equation of a line given the slope and y-intercept
- Find the equation of a line given one point and a slope
- Find the equation of a line given two points
- Find the equation of a line parallel to a given line
- Find the equation of a line perpendicular to a given line
- Apply the concepts

Be able to use the formulas
- Slope-Intercept form of a line: \(y = mx + b\)
- Point-Slope form of a line: \(y - y_1 = m(x - x_1)\)

Section 4:
Know The Following Definitions
- Linear inequality in two variables

Be Able To
- Verify solutions to an inequality in two variables
- Graph linear inequalities in two variables
- Apply the concepts

Section 5:
Know The Following Definitions
- Relation

Be Able To
- Determine whether a relation represents a function
- Function
- Input values
- Output values
- Domain of a function
- Range of a function
- Function notation

- Find the domain of a relation
- Find the range of a relation
- Graphs of relations
- Use function notation

**Section 6:**

**Know The Following Definitions**
- Vertical line test

**Be Able To**
- Apply the vertical line test
- Identify graphs of basic functions
- Apply the concepts

**Sample Applications of Chapter 3 Content**
- Read a graph
- Identify and interpret slope

**Example:** In the linear equation \( y = 2x + 4 \), the slope is 2 and means that the value of \( y \) increases two units for every one unit increase in the value of \( x \).

**Example:** If \( x \) represents the number of years since a car was purchased and \( y = -3200x + 23480 \) represents the value of the car, then the slope, which is -3200, means that the value of the car is decreasing by 3200 dollars per year.

- Calculate and interpret slope
- Write linear equation and interpret slope

- Use a given formula to calculate the basal metabolic rate (BMR) for a person

  **Example:** \( B(x) = 370 + 9.8x \) where \( B(x) \) the BMR, \( x \) is the lean body mass in pounds

- Use a given formula to calculate the height of men and women based on the femur length

  **Example:** \( H(x) = 1.88x + 32 \) where \( H(x) \) is the femur length for of a man, \( H \) is the man’s height in inches and \( x \) is the femur length in inches

- Use a given formula to calculate a specific cost, value