Section 3-1

Relations and Functions

Objectives for Section 3-1

- to determine the value of a function
- to determine a function to describe a solution set
- to find the value of composites of functions

Relations and Functions

- relation: any set of ordered pairs
- domain: the first component in an ordered pair
- range: the second component in an ordered pair
- rule: an open sentence that defines a given relation
- function: a relation such that no first component appears in more than one ordered pair
- composite: two or more functions combined to make a new function

Section 3-2

Graphing Functions and Relations

Objectives for Section 3-2

- to graph a relation and determine from the graph whether the relation is a function
- to graph a relation over a given domain
- to graph a relation over a given domain with a restricted range

Graphing Functions and Relations

- mapping diagram and Cartesian coordinate system: methods for visualizing the rule of a relation
- x-coordinate (abscissa): the first component in an ordered pair being diagramed on a Cartesian coordinate system
- y-coordinate (ordinate): the second component in an ordered pair being diagramed on a Cartesian coordinate system
- A relation is a function if and only if no vertical line intersects the Cartesian graph more than once.

Section 3-3

The Graph of a Linear Equation

Objectives for Section 3-3

- to graph an equation in two variables
- to find the value of either a missing coefficient or constant in an equation when given a point from its solution set

The Graph of a Linear Equation

- The graph of an equation of the form $Ax + By = C$, where A, B, and C are real numbers and A and B are not both zero, is a straight line.
- greatest integer function $\{f(x) = [x]\}$: the greatest integer less than or equal to x

Section 3-4

The Graph of a Linear Inequality

Objectives for Section 3-4

- to graph the solution set of a linear inequality

The Graph of a Linear Inequality

- The solution to a linear inequality is either an open or closed half plane. The boundary of the half plane is defined as the linear equation related to the inequality.

Section 3-5

The Slope of a Line

Objectives for Section 3-5

- to determine the slope of a line when given two points
- to determine the slope of a line when given its equation
- to use a point and a slope to graph a line and find the coordinates of other solutions to the equation
- to determine the value of a missing coordinate so that two points have a given slope

The Slope of a Line

- slope: a measure of the steepness of a line

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

- For all A, B and C that are real numbers and $B \neq 0$, the slope m of the line $Ax + By = C$ is $-\frac{A}{B}$

Section 3-6

Finding the Equation of a Line

Objectives for Section 3-6

- to determine the slope intercept form of a line when given a point and the slope
- to determine the slope intercept form of a line when given two points
- to determine the slope intercept form of a line when given a point and a the equation of a parallel line
- to determine the value of either a coefficient or constant when given the equation of a parallel line

Finding an Equation of a Line

- Identify a point on the line.
- Identify the slope of the line.
- Using the point-slope formula, $y - y_1 = m(x - x_1)$ substitute the coordinates of the point for x_1 and y_1 and the slope for m. rearrange the equation until it is in standard form with integral coefficients.

Section 3-7

Direct Variation

Objectives for Section 3-7

- to find a missing coordinate for a point in direct variation
- to determine the linear function when given two values of the function
- to determine the value of a constant k for a function when given a point from the solution set
- to find a missing coordinate for a point in the solution set of a linear function when given two other elements of the solution set
- to prove properties of proportion

Direct Variation

- If a linear function f is a direct variation, then for any two ordered pairs (x_1, y_1) and (x_2, y_2) determined by f, with x_1, $x_2 \neq 0$,

$$\frac{y_1}{x_1} = \frac{y_2}{x_2}$$

- In any proportion the product of the means is equal to the product of the extremes.