Name Answer Key

Chapter 1 Functions and Their Graphs

Section 1.1 Lines in the Plane

Objective: In this lesson you will review how to find and use the slope of a line to write and graph linear equations

Important Vocabulary		
Slope	**Parallel**	**Perpendicular**

I. The Slope of a Line

What you should learn:

How to find the slopes of lines

The formula for the **slope** of a line passing through the points (x_1, y_1) and (x_2, y_2) is $m =$ $y_1 - y_2 / x_1 - x_2$.

A line whose slope is positive rises from left to right.

A line whose slope is negative falls from left to right.

A line with zero slope is horizontal.

A line with undefined slope is vertical.

II. The Point-Slope Form of the Equation of a Line

What you should learn:

How to write linear equations given points on lines and their slopes

The **point-slope** form of the equation of a line is

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

This form of equation is best used to find the equation of a line when:

you are given slope and any point on the line

The **two-point form** of the equation of a line is $y - y_1 = \frac{y_1 - y_2}{x_1 - x_2}(x - x_1)$.

The two-point form of a line is best used to find the equation of a line when:

you are given any two points on the line and no slope

A **linear function** has the form $f(x) = mx + B$. Its graph is a line that has slope m and a y-intercept at $(0, B)$.

III. Sketching Graphs of Lines

What you should learn:

How to use slope-intercept forms of linear equations to sketch lines.

The **slope-intercept form** of the equation of a line is $y = mx + B$, where m is the slope and the y-intercept is (0, B).

The equation of a **horizontal line** is $y = B$. The slope of a horizontal line is 0. The y-coordinate of every point on the graph of a horizontal line is B.

The equation of a **vertical line** is $x = a$ (a: any number). The slope of a vertical line is undefined. The x-coordinate of every point on the graph of a vertical line is a.

The **general form** of the equation of a line is $Ax + By = C$ (might also be seen as $Ax + By + C = 0$).

Every line has an equation that can be written in general form (Standard form).

IV. Parallel and Perpendicular Lines

What you should learn:

How to use slope to identify parallel and perpendicular lines

The relationship between the slope of two lines that are parallel is: They are equal

$m_1 = m_2$

The relationship between the slope of two lines that are perpendicular is:

they are opposite reciprocals.

$m_1 = -\frac{1}{m_2}$

opposite reciprocal

this works just as well too

$m_1 \times m_2 = -1$

A line that is parallel to a line whose slope is 2 has a slope of 2.

A line that is perpendicular to a line whose slope is 2 has a slope of $-\frac{1}{2}$.

Section 1.1 Examples – Lines in the Plane

(1) Find the point-slope form of the equation that passes through the given point and has the indicated slope.

$(-3, 6)$ $\quad m = -2$

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

$\boxed{y - 6 = -2(x+3)}$

(2) Decide whether the two lines are *parallel*, *perpendicular*, or *neither*.

$y = 4x - 1$ $\quad 2x + 8y = 12$

$m_1 = 4$

$8y = -2x + 12$

$y = \frac{-1}{4}x + \frac{3}{2}$

$m_2 = \frac{-1}{4}$

$\boxed{\text{Perpendicular}}$

(3)Determine the slope and y-intercept (if possible) of the linear equation.

$3x + 4y = 1$

$4y = -3x + 1$

$y = \frac{-3}{4}x + \frac{1}{4}$

$\boxed{\begin{array}{l} m = \frac{-3}{4} \\ y\text{-int: } (0, \frac{1}{4}) \end{array}}$ ← This is a location (a point); therefore, it must have an x- and y-value in the answer