2024 Fall Math 140 Week-In-Review

Week 2: Sections 2.1-2.2

Section 2.1: Review of Lines

Some Key Words and Terms: Point, Quadrant, Line, Linear, Slope, Vertical Line, Horizontal Line, Slope-Intercept Form, Point-Slope Form, Standard Form

Point:

Quadrant:

Line and Linear:

Slope:

Vertical and Horizontal Lines:

Forms of Lines:

Examples:

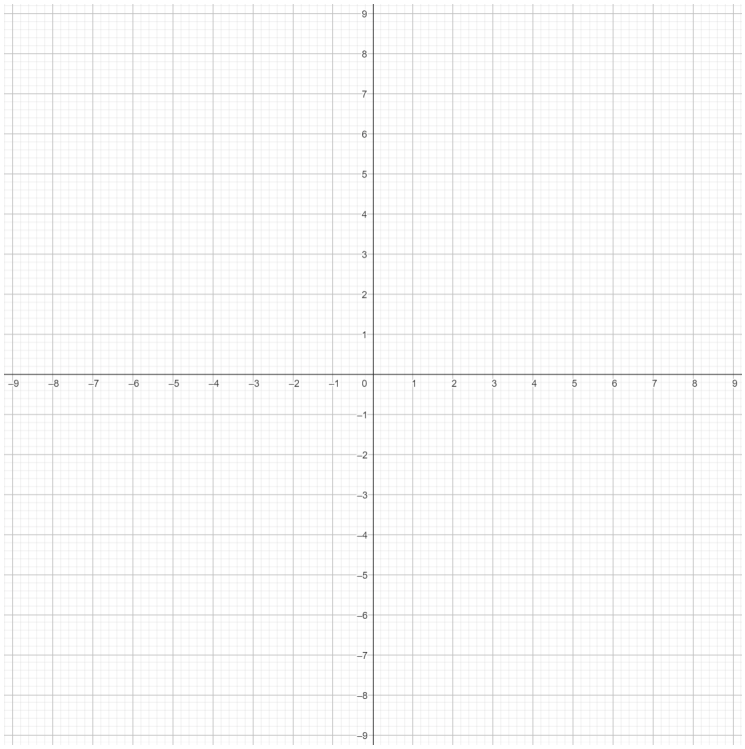
1. The points $(-6, 2)$ and $(-2, -1)$ form a line. Determine the following:

   (a) The slope of the line.

   (b) The equation of the line in Point-Slope Form.

   (c) The x and y intercepts, if they exist.

   (d) The graph of the line.



2. For a point (x, y) on the line given by $5x - 3y = 11$, determine the following:

(a) The corresponding change in the y-coordinate of the point if the x-coordinate increases by 5 units.

(b) The corresponding change in the x-coordinate of the point if the y-coordinate decreases by 3 units.

Section 2.2: Modeling with Linear Functions

Some Key Words and Terms: Linear Functions, Linear Depreciation, Rate of Depreciation, Scrap Value, Cost, Variable Cost, Quantity, Fixed Cost, Revenue, Price, Profit, Supply, Demand

Linear Functions:

Linear Depreciation:

Cost, Revenue, and Profit:

Supply and Demand:

Examples:

1. Before going to college, a student decides to invest in a scooter to get around campus. After one year, the scooter they purchased would still be worth \$563.45. When the student graduates (assume 4 years after starting college), the scooter they purchased would still be worth \$303.80. The scooter uses special electronics that will always be worth at least \$100. Let $V(t)$ be a linear function modeling the current value of the scooter, in dollars, after t years. Determine the following:

   a. The yearly depreciation rate for the students' scooter.

   b. The purchase price of the scooter.

   c. The linear function, $V(t)$, representing the value of the scooter after t years.

   d. How many years it will take for the scooter to reach its scrap value. (round your answer to the nearest tenth of a year)

2. A company produces a laptop/tablet combo targeted towards college students. When the company produces 50 combos, they incur a total cost of \$18,750 and when they produce 100 combos, they incur a total cost of \$25,200. Determine the linear cost function, $C(x)$, for the company when they produce x laptop/tablet combos.

3. When the company from the previous example sells 75 combos, they have a total revenue of \$18,675. Determine the linear revenue function, $R(x)$, for the company when they sell x laptop/tablet combos.

4. A company produces and sells Red-Eyes: a super-duper alarm clock for college students. The total production cost for the company when they produce x Red-Eyes is given by the function $C(x) = 17x + 1,250$. The total revenue for the company when they sell x Red-Eyes is given by the function $R(x) = 39.99x$. Determine the following:

   a. The profit function, $P(x)$, for the company when they produce and sell x Red-Eyes.

   b. How many Red-Eyes the company needs to sell in order to actually turn a profit.

5. A company produces and sells a specialized fan designed to be used in dorm rooms called the 'Wind-Mate'. When the selling price of Wind-Mates is set at \$20, the company is will to supply 5,000 fans. If the selling price increases to \$25, the company is willing to supply an additional 2,000 fans. Determine the linear price function for supplying x Wind-Mates.

6. A T-shirt supplier is planning to capitalize on the reintroduction of the Aggie/Longhorn game this semester. According to their market research, if they set the price of t-shirts at \$30 per t-shirt, then consumers will demand 22,400 t-shirts. If they increase the price by \$9 per t-shirt, then consumers will only demand 19,900 t-shirts. Determine the linear price function for demanding x t-shirts.