# Homework 1

## Problem 1

a. A linear function has slope $-1$ and contains the point $(-3, 5)$. Find the equation for this function. Sketch the graph of this function.

b. Find the slope and the formula of a linear function passing through the points $(0, -6)$ and $(-1, -9)$.

c. Could the table below represent a linear function? How do you know? If the table represents a linear function, find the formula/equation of the function.

| $x$ | -12 | -6 | 0 | 6 |
|---|---|---|---|---|
| $y$ | 50 | 26 | 2 | -22 |

## Problem 2

Working as an insurance salesperson, Ilya earns a base salary and a commission on each new policy, so Ilya's weekly income,$I$, depends on the number of new policies, $n$, he sells during the week. Last week he sold 3 new policies, and earned \$760 for the week. The week before, he sold 5 new policies, and earned \$920. Find an equation for $I(n)$, and interpret the meaning of the slope and intercept.

## Problem 3

You want to choose one long distance telephone company from the following options:

Company A charges \$0.39 per minute (no fixed monthly charges)

Company B charges \$13.7 per month and \$0.22 per minute.

Company C charges a fixed rate of \$50 per month.

Let $A(x)$, $B(x)$, and $C(x)$ be the cost of using each company for $x$ minutes on long distance calls.

a. Write a formula for the cost of using each company as a function of the number of minutes used, $x$.

b. If you spend 125 minutes talking long distance per month, which company would be the cheapest? Be sure to justify your answer.

c. Jennifer, a subscriber for company $B$, paid \$120 for long distance calls last month. How many minutes did she spend on long distance calls?

## Problem 4

A local retailer has determined that the number of PortaBoy game systems, $x$, sold in a week is related to the price, $p$, in dollars of each system. 75 game systems were sold when the price was \$140. When the systems went on sale the following week, 150 systems were sold at \$80 a piece.

a. Find the equation of the line that represents the relationship between the number of game systems sold and the price of each system.

b. How many game systems will be sold if the price is \$100?

c. If the retailer wants to sell 150 PortaBoys next week, what should the price be?

## Problem 5

The supply function for a product is given by $s(p) = 1000 + 25p$, where $p$ is the price in dollars per pound. The equilibrium price is \$2 and the demand is 225 lbs when the price is \$13.

a. Find the demand function, $d(p)$, for the product.

b. Find the equilibrium quantity.

## Problem 6

You decide to start a small online shop selling branded water bottles. The fixed costs for your production line is \$525, and your total cost to produce 1000 bottles is \$2675. Your bottles sell for \$4.95 each.

a. Find the cost function, $C(x)$ for your production.

b. How many bottles must you sell to break even?

c. How many bottles must you sell to make a profit of \$1000?