

# 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.

- Write a formula for the cost of using each company as a function of the number of minutes used,  $x$ .
- If you spend 125 minutes talking long distance per month, which company would be the cheapest? Be sure to justify your answer.
- 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.

- Find the cost function,  $C(x)$  for your production.
- How many bottles must you sell to break even?
- How many bottles must you sell to make a profit of \$1000?