

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?