Math 141 Week in Review
Week 1 Problem Set

1. Find the equation of the line that passes through the point (1, –2) and:

A. the point (5, 6).

B. has a slope of 0.

C. is parallel to the line $y = -7x + 8$.

D. is parallel to the y-axis.

2. Find the equation of the line that crosses the x-axis at 4 and the y-axis at –3.

3. Find the equation of the line that is perpendicular to the line $6x - 2y = 12$ and passes through the x-intercept of this line.

4. Line L passes through the points $(1, w)$ and (3, 5). Line N passes through the points (2, –2) and $(w - 1, -4)$. Find the value of w that makes these lines perpendicular.

5. Benjamin bought a car for $17,500. After 4 years the car has a book value of $8,500.

A. Assuming a linear relationship, what is the rate of depreciation?

B. Find a formula for the book value of the car after t years.

C. When will the car be worth $6,250?

D. If the car is to be depreciated over its useful life of 7 years, what is the scrap value of the car?

6. A mail-order DVD service has monthly fixed costs of $51,600 and a production cost of $3 per subscription. A subscription sells for $15.

A. Write equations that can be used to represent the monthly costs, revenue, and profit for the service.

B. How many subscriptions must the service sell in order to break even?

7. A DVD player company incurs $30,000 in fixed costs each month and production costs of $80 per DVD player. The company earns a profit of $42,000 when they sell 600 DVD players in a month.

A. What is the selling price of a DVD player?

B. What is the profit function for this company?

8. A toaster manufacturer pays $4,500 in fixed costs each month. The production of 55 toasters in a month incurs a total cost of $5,105. Each toaster is sold for $16.

A. What is the production cost per toaster?

B. What are the cost, revenue, and profit functions for the toaster manufacturer?

C. What is the break-even quantity for this manufacturer?

9. A sandwich shop found that when the unit price for a sandwich is \$4, then the monthly quantity demanded is 12,000. When the unit price increases by \$2, then 3000 fewer sandwiches are demanded.

A. Find the demand equation (assuming that it is linear).

B. How many sandwiches will be demanded at a unit price of \$3?

C. At what price will no sandwiches be demanded?

10. Suppose you are given a demand equation of $8p + 10x = 80$ where x is the quantity demanded at a unit price of p dollars, and a supply equation of $12p - x = 24$ where x is the quantity supplied at a unit price of p dollars. What is the market equilibrium?

11. An office goods store found that they could sell 90 pens per week if the pens cost \$1 each, but if they increase the price by \$1 per pen, then only 30 pens are sold. The suppliers are only willing to supply 60 pens when the unit price is \$2, and will not supply any pens if the unit price is \$1 or below.

A. Find the supply and demand equations (assuming they are linear).

B. Find the market equilibrium.

12. At a price of \$55 per ticket, the supply and demand for tickets to an all-day music festival are 4600 and 3000 tickets, respectively. When the price drops to \$35, the supply decreases to 2200 tickets while the demand increases to 4600 tickets. Assuming that the supply and demand equations are linear, find equations for each. What are the equilibrium price and quantity of tickets to the festival?