Math 120 HW #6

Due: Nov. 15

Chapter 3.4

Solve the following systems using elimination

1.

$$x + 4y = 3$$
$$3x - 2y = -5$$

2.

$$4x + 2y = 9$$
$$5y - 4x = 5$$

5.

$$u + v = 5$$
$$u - v = 7$$

8.

$$3x + 5y = 7$$
$$5x + 9y = 7$$

Solve the following systems using substitution

3.

$$3x - 4y = 13$$
$$2x + 3y = 3$$

4.

$$2x - y = 1$$
$$-x + 2y = 7$$

13.

$$5p + 11q = 7$$
$$10p + 22q = 33$$

26. A gardener has two fertilizers that contain different concentrations of nitrogen. One is 3% nitrogen and the other is 11% nitrogen. How many pounds of each should she mix to obtain 20 pounds of a 9% concentration?

30. On a trip on a raft, it took 1/2 hour to travel 10 miles downstream (with the current). The return trip took 3/4 hour (against the current). Find the speed of the raft in still water.

33. United Products Co. manufactures calculators and has plants in the cities of Exton and Whyton. At the Exton plant, fixed costs are \$7000 per month, and the cost of producing each calculator is \$7.50. At the Whyton plant, fixed costs are \$8800 per month, and each calculator costs \$6.00 to produce. Next month, United Products must produce 1500 calculators, and they want the total cost at both plants to be equal. How many calculators must be produced at each plant?

36. In news reports, profits of a company this year (T) are often compared with those of last year (L), but actual values T and L are not always given. This year, a company had profits of \$25 more than last year. The profits this year were up 30%. Determine T and L from this data.

Chapter 3.5

Solve the given nonlinear system. It may be helpful to include a graph.

1.

$$\begin{aligned} y &= x^2 - 9 \\ 2x + y &= 3 \end{aligned}$$

2.

$$\begin{aligned} p^2 &= 5 - q \\ p &= q + 1 \end{aligned}$$

10.

$$\begin{aligned} z &= 4/w \\ 3z &= 2w + 2 \end{aligned}$$

Chapter 3.6

Suppose you are given the following supply and demand curves for a product. Determine the equilibrium point - the location where supply and demand are equal. Note that your solution must make sense financially, ie. no negative quantities.

1. Supply: $p = \frac{4}{100}q + 3$,
Demand: $p = -\frac{6}{100}q + 13$

5. Supply: $p = 2q + 20$,
Demand: $p = 200 - 2q^2$

14. Suppose the total cost during a financial quarter as a function of units moved q is $y_c = 3q + 400$. Also suppose that the revenue made in that quarter is $y_r = \frac{1}{10}q^2 + 9q$. What is the break even quantity, the point at which cost and revenue are equal?

19. A manufacturer of a children's toy will break even at a sales volume of $200,000. Fixed costs are $40,000, and each unit sells for $5. Determine the cost per unit.