Math 199
Fall, 2004
Word Problems

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1. Chris and Josh have received walkie-talkies for Christmas. If they leave from the same point at the same time, Chris walking north at 2.5 mph and Josh walking east at 3 mph, how long will they be able to talk to each other if the range of the walkie-talkies is 4 miles? Round your answer to the nearest minute.

2. A plane flies nonstop from New York to London, cities which are about 3500 miles apart. After one hour and 6 minutes in the air, the plane passes over Halifax, Nova Scotia, which is 600 miles from New York. Estimate the flying time from New York to London.

3. On vacation, Le Hong averaged 50 mph traveling from Denver to Minneapolis. Returning by a different route that covered the same number of miles , he averaged 55 mph. What is the distance between the two cites if his total traveling time was 32 hours?

4. Joan wants to buy a rug for a room that is 12 feet by 15 feet. She wants to leave a uniform strip of floor around the rug. She can afford 108 square feet of carpeting. What dimensions should the rug have?

5. Deer ticks cause concern because the can carry Lyme disease. One study found a relationship between the density of acorns produced in the fall and the density of deer tick larvae the following spring. the relationship can be approximated by the linear equation $y = 34x + 230$ where x is the number of acorns per square meter in the fall and y is the number of deer tick larvae per 400 square meters the following spring. According to this formula, approximately how many acorns per square meter would result in 1000 deer ticks larvae per 400 square meters?

6. One car rental firm charges \$75 for a weekend rental (Friday afternoon through Monday morning) with unlimited mileage. A second firm charges \$50 plus 5 cents per mile. For what range of miles driven is the second firm cheaper?

7. Write the cost function for a trailer hauling service which charges \$45 plus \$2 per mile.

8. The total cost (in dollars) to produce x compact discs is $C(x) = 6.80x + 450,000$.

   (a) What are the fixed costs?
   (b) What is the marginal cost per disk?
   (c) What is the total cost of producing 50,000 discs?
   (d) What is the average cost per disk when 50,000 discs are made?
   (e) If the CD's sell for \$15, what is the break even point?

9. Suppose that the demand and price of a certain shampoo are related by $p = 16 - \frac{5}{4}q$ where p is price and q is the quantity demanded.

   (a) Find the price for a demand of 0 units? 4 units? 8 units?

(b) Find the demand for the shampoo at a price of \$4.

(c) The supply equation is $p = \frac{3}{4}q$ where q is the quantity supplied and p is price. Find the supply when the price is \$0? \$10?

(d) Find the equilibrium quantity for the shampoo.

(e) Find the equilibrium price.

(f) Find the equilibrium point.

10. You graduate from SHSU and get a job! You are making \$36,000 per year. You pay \$700 a month for rent, \$150 a month for insurance, and \$350 a month for your car note. You decide never to eat Ramen noodles again, so you give yourself \$200 per month for food. Cable is \$75 per month, your cell phone is \$35, and the high speed modem is another \$50. Electricity and gas cost \$250 per month.

    (a) How much "extra" money do you have per month?

    (b) You stick \$500 per month under your mattress. When will you have \$1 million?

    (c) You stick \$1000 per month under your mattress. When will you have \$1 million?

    (d) How much would you have to put under your mattress each month to earn \$1 million in 30 years?

11. You put \$500 into a savings account. If it earns 3% compounded annually, how much money will you have in 30 years?

12. How much money would you have to put into a savings account today, at 3% compounded annually to have \$1 million in 30 years?

13. You put \$500 into a savings account. If it earns 3% compounded monthly, how much money will you have in 30 years?

14. How much money would you have to put into a savings account today, at 3% compounded monthly to have \$1 million in 30 years?

15. You put \$500 into a savings account. If it earns 3% compounded continuously, how much money will you have in 30 years?

16. How much money would you have to put into a savings account today, at 3% compounded continuously to have \$1 million in 30 years?

17. What is a better investment plan? How would you invest to ensure that you have \$1 million in 30 years?

18. What happens if you invest \$500 per month into an account each month for the next 20 years at 3% compounded monthly. How much money will you have after 20 years?

19. If you then leave that money in an account earning 5% for the next 10 years, how much money will the account be worth when you retire?