Math 122 Worksheet 2

Show all work for full credit. Report all decimals to 3 decimal places.

1. A small town's population is modeled by the following equation

$$P = 2500(1.035)^t,$$

where t represents the number of years since 1995.

a. Find the average rate of change of the population from $t = 5$ to $t = 15$. Give units.

b. Interpret your answer from part (a) in relation to the town's population.

2. A 0.45 caliber pistol is fired straight upward from a spot on level ground. The projectile's height above the ground (in feet) after t seconds is given by

$$s(t) = -16t^2 + 850t.$$

Calculate the average velocity of the projectile from $t = 5$ to $t = 20$. Give units.

3. A company that manufactures liquid car wax can produce 80 bottles of wax for \$1225 and 200 bottles of wax for \$1807. The car wax sells for \$7.95 per bottle.

a. Find linear functions to represent the company's cost and revenue.

b. Determine the company's break-even point. (Show how you determined this.) Explain the significance of this point to the company.

4. The chart below gives the cost, $C(q)$, and the revenue, $R(q)$, associated with producing a quantity q of some good.

q	50	75	100	125	150
$C(q)$	1650.50	2061.75	2473.00	2884.25	3295.50
$R(q)$	1397.50	2096.25	2795.00	3493.75	4192.50

a. Find a formula for the cost function, $C(q)$.

b. Find a formula for the revenue function, $R(q)$.

c. What is the variable cost per unit? _____

d. What price is being charged for the item? _____

e. How many units of the item do we have to sell to make a profit?
(How did you determine this?)

5. The table below gives values of a function $f(t)$.

t	0	4	8	12	16	20	24
$f(t)$	100	74	52	34	22	14	10

a. Does the function appear to be increasing or decreasing over the given interval?
_____

b. Does the graph of the function appear to be concave up or concave down?
_____

6. If the price of a book bag changes from \$45 to \$27, what is the relative, or percent, change in price?