Extra Linear Word Problems

1. A company finds that it can produce 10 solar heaters for $7500 while the production of 20 heaters costs $13,900. If cost is a linear function of the number of heaters produced, express the cost function $C(x)$ where x is the number of heaters produced.

2. Speedy printing charges $23 for 200 deluxe business cards and $35 for 500 deluxe business cards. Assume that the cost is a linear function of the number of cards printed.
a) Find a linear formula for the cost as a function of the number of cards printed.
b) What information does the y-intercept convey?
c) Using the function from part (a), determine the cost for printing 700 cards.

3. The average retail price in the Spring of 2000 for a used Camaro Z28 coup depends on the car as shown in the following table. (Edmund's, www.Edmunds.com).
a) Find a linear function to model the price of the car as a function of age.
b) In a sentence, interpret the meaning of the slope of the line.
c) Using your equation from part (a), predict the average retail price for a 7-year-old Camaro.

Age(yrs)	Price ($)
2	15,925
5	10,490

4. A small college had 2546 students in 1994 and 2702 students in 1996. If student population grows as a linear function of time, how many students will the college have in 2003? Find the equation for the function that relates student population to time.

5.You own a general contracting firm. You buy a bulldozer for $80,000. the life of the bulldozer is considered to be 10 years, at which time the salvage value is $7500. Express the value of the bulldozer as a function of time, and use this function to find the value of the bulldozer after 6.5 years.

6. Suppose your salary was $23,500 in 1994 and $26,000 in 1997. If you salary grows at a constant rate, find an expression for salary as a function of time, and use the expression to calculate your expected salary in 2004.

7. In dormitory A there are 300 students; 1500 cans of soda are consumed in this dormitory per week. In dormitory B, the number of students is 240; consumption in this dorm amounts to 1260 cans per week. If soda consumption is a linear function of the number of students present, how many sodas should be stocked in dormitory C that has 1875 students? What is the value of the y-intercept of the soda consumption function?

8. In 1997 the total amount of money given to symphony orchestras was 161 million dollars, and in 1999 the amount was 179.8 million. We assume that contributions grow as a linear function of time. Define $C(t)$, the amount of money contributed as a linear function of time t.

9. A 100-gallon tank is initially full of water and being drained at a rate of 5 gallons per minute.
a) Write an equation for a linear function *f* that models the number of gallons in the tank after *x* minutes.
b) How much water is in the tank after 4 minutes?
c) Graph *f*. Identify the *x* and *y*-intercepts and interpret each. Find both the theoretical and practical domain and range of the function.

Answers.

1. $C(x) = 640x + 1100$

2. (a) $C = .04x + 15$, (b) Fixed Cost (c) $C(700) = \$43$

3. $P(t)$ is car price as a function of time. (a) $P(t) = -1811.67t + 19548.35$, where *t* is age in years. (b) The slope expresses the decrease in value per year for the car.
(c) $P(7) = \$6,866.67$

4. $S(t)$ is student population as a function of time, where $t = 0$ for 1994. Then $S(t) = 78t + 2546$, and for 2003 ($t = 9$) $S(9) = 3248$

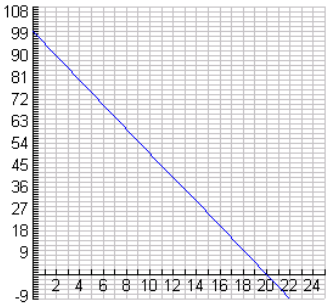
5. $V(t)$ is bulldozer value as a function of time. Then $V(t) = -7250t + 80000$ and $V(6.5) = \$32,875$

6. $S(t)$ is salary as a function of time, with $t = 0$ for 1994. Then $S(t) = 2500t + 23500$ and for 2004 $(t = 10)$, $S(10) = \$31,833.33$

7. (a) 7800 (b) 300

8. $C(t) = 9.4t + 161$ where $t = 0$ for 1997 and $C(t)$ is contributions (in millions of dollars) as a function of time.

9. $G(t)$ is the number of gallons in the tank as a function of pumping time. (a) $G(t) = -5t + 100$ (b) $G(4) = 80$ gallons



(c)
x-intercept $(20,0)$; y-intercept $(0,100)$
Theoretical : Domain $(-\infty,\infty)$, Range $(-\infty,\infty)$
Practical: Domain $[0,20]$, Range $[0,100]$