1. A cell phone company charges a monthly fee of $29.95 and $1.12 a minute for calls made during any time of the day or night.
   a) Express the monthly cost, $C$, as a function of $x$, the number of minutes used.
   b) What will the monthly cost be if you use this cell phone for 415 minutes this month?

2. Lisa can not remember which long distance plan she has with her phone company. However, she knows that she pays a basic monthly fee and a rate per minute for long distance calls. In June her bill was $53.95 for 120 minutes of long distance calls and in July it was $68.55 for 412 minutes.
   a) Express the monthly cost, $C$, as a function of $x$, the number of minutes of long distance calls made.
   b) What will the monthly cost be in August if she makes 620 minutes of long distance calls?

3. The population of a small town in Central Florida has shown a linear decline in the years 1995-2004. The population in 1995 was 8778 and in 2004 it was 8274.
   a) Write a linear equation expressing the Population, $P$, of this town as a function of $t$, the number of years since 1995.
   b) If this town is still experiencing a linear decline, what will the population be in 2006?

4. The population of a small town in Georgia has shown a linear growth in the years 1990-2003. In 1990 the population was 13,462 and has been growing at a rate of 235 people per year.
   a) Write a linear equation expressing the Population, $P$, of this town as a function of $t$, the number of years since 1990.
   b) If this town continues to experience a linear increase in population, what will the population be in 2006?

5. It has been observed that the average number of sodas, $N$ served per person at football games increases linearly as the temperature, $t$, increases. When the temperature is 80 degrees fans consume .5 sodas on average. At 88 degrees, 1.5 sodas are consumed.
   a) Express the number of sodas, $N$ as a function of the temperature $t$.
   b) How many sodas on average will be consumed if the temperature rises to 90o?

6. The number of chirps per minute, $C$ that the tree cricket makes is linearly dependent on the temperature, $t$ in Fahrenheit. The crickets do not chirp at all at 40 degrees and at 80 degrees they chirp about 168 times a minute.
   a) Express the number of chirps, $C$ as a function of the temperature $t$.
   b) How many chirps will they make at 90 degrees?

(revised 8/08)
7. **COST FUNCTION:** A company produces computers. The total cost to produce 20 computers is $15,000. The daily fixed costs are $2500. (Fixed cost refers to expenses that must still be paid even when producing zero computers, such as rent, utilities, insurance.) Assume total cost is linearly related to output (number of computers produced).
   a. Graph the total cost $C$ versus output $x$.
   b. Determine the equation of the line. That is, determine the Cost function $C(x)$.
   c. What is the total cost to produce 12 computers?
   d. What is the cost to produce each additional computer?

8. **COST FUNCTION:** A company produces MP3 Players. The total cost to produce 140 players is $13,000. The total cost to produce 200 players is $17,200. Assume total cost is linearly related to the number of MP3 Players produced.
   a. Graph the total daily cost $C$ versus number of MP3 players $x$.
   b. Determine the equation of the line. That is, determine the Cost function $C(x)$.
   c. What is the amount of the Fixed Cost?
   d. What is the total cost to produce 300 Players?
   e. What is the cost to produce each additional player?

9. **LINEAR DEPRECIATION:** A company buys a new piece of equipment for $100,000. The equipment is to be depreciated linearly over its useful life of 20 years. Its salvage value at the end of 20 years is $12,000.
   a. Graph the Value $V$ versus time $t$.
   b. Determine the function $V(t)$.
   c. What is the value after 5 years?

(revised 8/08)
1. a) \( C(x) = .12x + 29.95 \)
   
   b) \( C(415) = .12(415) + 29.95 = $79.75 \)
   
   The monthly cost will be $79.75 for 415 minutes.

2. a) \( C(x) = .05x + 47.95 \)
   
   b) \( C(620) = .05(620) + 47.95 = $78.95 \)
   
   The monthly cost will be $78.95 dollars for 620 minutes.

3. a) \( P(t) = -56t + 8778 \)
   
   b) \( P(11) = -56(11) + 8778 = 8,162 \)
   
   The population will be 8,162 people in 2006.

4. a) \( P(t) = 235t + 13462 \)
   
   b) \( P(16) = 235(16)t + 13462 = 17222 \)
   
   The population will be 17,222 people in 2006.

5. a) \( N(t) = .125t - 9.5 \) \hspace{1cm} Or \hspace{1cm} \( N(t) = \frac{1}{8}t - \frac{19}{2} \)
   
   b) \( N(90) = .125(90) - 9.5 = 1.75 \) \hspace{1cm} OR \hspace{1cm} \( N(90) = \frac{1}{8}(90) - \frac{19}{2} = 1.75 \)

   The average soda consumption will be 1.75 sodas per person.

6. a) \( C(t) = 4.2t - 168 \)
   
   b) \( C(90) = 4.2(90) - 168 = 210 \)

   The crickets will chirp 210 times per minute when the temperature is 90°F.

7. b) \( C(x) = 625x + 2500 \)
   
   c) \( C(12) = 625(12) + 2500 = $10,000 \).

   The Total Cost for 12 computers is $10,000.

   d) Each additional computer will cost $625.

8. b) \( C(x) = 70x + 3200 \)
   
   c) The Fixed Cost is $3,200.

   d) \( C(300) = 70(300) + 3200 = $24,200 \)

   The Total Cost to produce 300 players is $24,200.

   e) Each additional player will cost $70.

9. b) \( V(t) = -4400t + 100,000 \)
   
   c) \( V(5) = -4400(5) + 100,000 = $78,000 \)

   The Value is $78,000 after 5 years.

(revised 8/08)