

### Math 111 Worksheet 3

**Show all work for full credit. All decimals should be correct to three (3) places beyond the decimal.**

1. Suppose that the population of killer bees in Texas  $t$  months from today is modeled by the function

$$B(t) = 6500(1.04)^t .$$

On average, how quickly (in bees/month) is the Texas killer bee population predicted to increase over the next 3 years?

2. A model for the temperature,  $T$ , in  $^{\circ}F$ , of a typical spring day is given by

$$T(t) = -0.8t^2 + 8t + 60 ,$$

where  $t$  is the number of hours since 8am.

a. Calculate the average rate of change of  $T(t)$  between  $t = 2$  and  $t = 6$ . Give units.

b. Interpret your answer from (a) in everyday language.

3. Find an equation of the linear function that passes through the points (22, 14.4) and (30, 40). Give your answer in *slope-intercept* form.

4. Jessica started working for Acme Manufacturing Company in 1999. In 2004, she was earning \$13.50 per hour. Now, in 2010, she is earning \$18.90 per hour. She has received exactly the same annual raise each year she has been there.

a. Write a linear function describing her hourly wage,  $w$ , as a function of time,  $t$ , in years since 1999.

b. What was her beginning hourly wage?

c. Jessica's goal is to earn at least \$25 per hour. If she continues to earn the same annual raise, in what year will Jessica achieve her goal?

5. A piece of equipment purchased today for \$80,000 will depreciate linearly to a scrap value of \$2000 after 20 years. Write a formula for its value,  $V$ , as a function of time,  $t$ , in years.

6. The cost in dollars for a company to produce  $q$  chemistry sets is given by the linear function  $C(q)$  whose graph is shown below. Find a formula for  $C(q)$ .

