6. Kathy plans to purchase a car that depreciates at a rate of 9.2% per year. The initial cost of the car is $21,000. Determine the value of the car after 3 years.

7. A construction company purchased some equipment costing $300,000. The value of the equipment depreciates at a rate of 14% per year.

a) Write a formula $C(t)$ that models the value of the equipment.

b) What is the value of the equipment (to the nearest dollar) after:
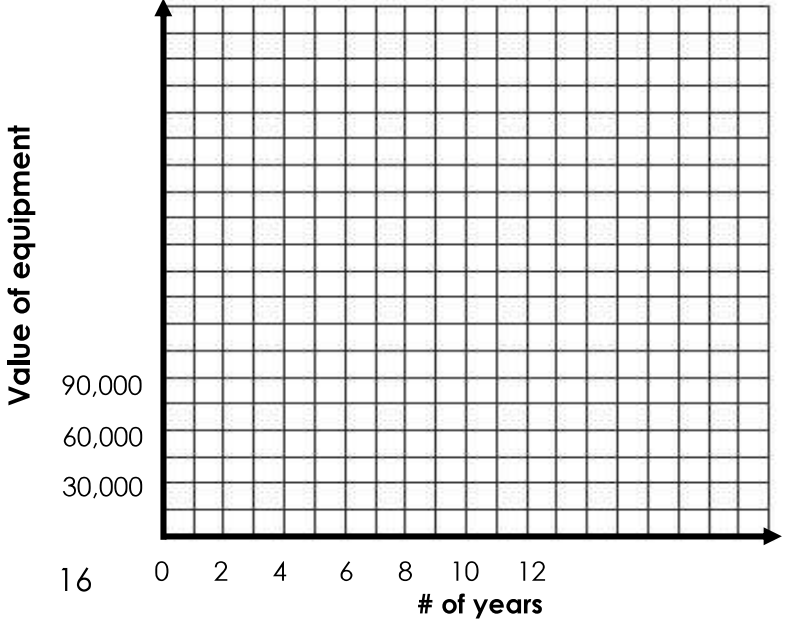
   i) 2 years?

   ii) 4 years?

   iii) 6 years?

   iv) 8 years?

   v) 10 years?

c) Graph the points from *part b* on the grid below.

t	C(t)
2	
4	
6	
8	
10	

Value of equipment

90,000

60,000

30,000

16

0   2   4   6   8   10   12

# of years

Exponential Application Word Problems (Day 6–5)

1. An oil spill is spreading such that its area is given by the exponential function $A(t) = 250(1.15)^t$, where A is the area in square feet and t is the time that has elapsed in days.

   a) How large was the oil spill initially?

   b) By what percent is the oil spill increasing each day?

2. A population of 50 fruit flies is increasing at a rate of 6% per day. Which of the following is closest to the number of days it will take for the fruit fly population to double?

   (1) 18   (3) 12

   (2) 6   (4) 28

3. Water drains out of a pool, the depth of the water decreases at a constant rate of 20% per hour. The depth of the water, when the draining begins, is 12 feet.

   Write an equation that gives the depth, D, of the water in the pool as a function of the time in hours it has been draining, t.

   What is the depth of the pool in 5 hours?

   It's safe to cover the pool after it reaches a depth of 1 foot or less. What is the minimum number of whole hours that we should wait to cover the pool?
   Explain how you found your answer.

4. The value of an early American coin increases in value at the rate of 6.5% annually. If the purchase price of the coin this year is $1,950, what is the value to the nearest dollar in 15 years?

5. A population of fruit flies is growing at a constant rate of 6% per hour. The population starts started with 28 flies.

   a) Write a formula that models the population, P, as a function of the time in hours, t.

   b) What will be the population of flies in 2 days?

6. Which of the following equations would model an exponential quantity that begins at a level of 16 and decreases at a constant rate of 8% per hour?

   (1) $Q = 16(0.92)^t$ (3) $Q = 16(1.08)^t$
   (2) $Q = 16 + 0.92^t$ (4) $Q = 16(-7)^t$

7. The amount, A, in grams of radioactive material that is decaying can be modeled by $A(d) = 450(0.88)^d$, where d represents the number days since it started its decay.

   a) What percent is the material decaying per day?

   b) Given an interpretation of the fact that $A(14) = 75$.

1. Tabitha purchased a house in 2002 for $179,000. The house is expected to appreciate in value about 15% per year. Which equation could be used to find the house's value, V, after t years?

   (1) $V = 179,000(.85)^t$ (3) $V = 179,000(.15)^t$

   (2) $V = 179,000(1.85)^t$ (4) $V = 179,000(1.15)^t$

2. If a radioactive substance is quickly decaying at a rate of 13% per hour approximately how much of a 200 pound sample remains after one day to the nearest tenth of a pound?

3. A mouse population starts with 2,000 mice and grows at a rate of 5% per year. The number of mice after t years can be modeled by the equation, $P(t) = 2000(1.05)^t$. What is the rate of change between the second year and the fifth year rounded to the *nearest whole number*?

   (1) 116   (3) 2205

   (2) 348   (4) 2553

4. In 2006, the number of wolves in a wildlife preserve is 5,400. The average growth rate is 3%. If this growth rate continues, how many wolves will there be in 2016?

5. Tammy is saving money in a bank that charges a fee if the account is inactive for an extended period of time. The equation $y = 1250(.75)^x$ represents the value, y, of one account that was left inactive for a period of x years. Which statement below is true?

    (1) 1250 is the y-intercept, it is the amount of money in the account after x years
    (2) 1250 is the y-intercept, it is the amount of money in the account initially
    (3) 0.75 is the percent of money in the account initially
    (4) 0.75 is the percent of money in the account after x years

6. Rhonda deposited $3000 in an account in the Merrick National Bank, earning 4.2% interest, compounded annually. She made no deposits or withdrawals. Write an equation that can be used to find B, her account balance after t years.

7. What is the average rate of change for the function $f(x) = x^2 - 2x$ over the interval $[-3, 2]$?

8. Which table represents a function? State the reason why.

(1)

x	2	4	2	4
f(x)	3	5	7	9

(3)

x	3	5	7	9
f(x)	2	4	2	4

(2)

x	0	−1	0	1
f(x)	0	1	−1	0

(4)

x	0	1	−1	0
f(x)	0	−1	0	1