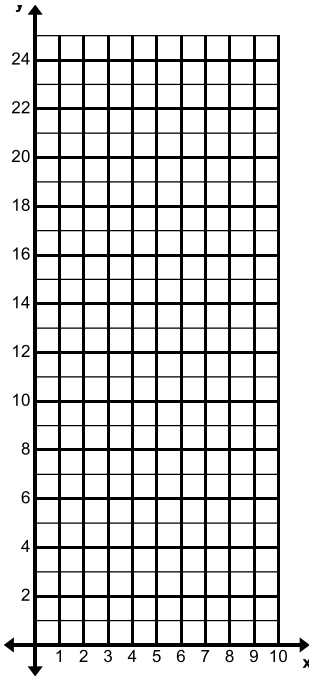
Unit 3 Day 7 - Decay Assignment Name: _____

1. Lexi has a 24-inch string of licorice to share with her friends. As each friend asks her for a piece, Lexi gives her half of what she has left. She doesn't eat any of the licorice herself.

Make a table showing the length of licorice Lexi has left each time she gives a piece away.

| Cuts | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Amount of Licorice Left | | | | | | |




b. Make a graph of the data from part (a) on the axes to the right.

c. Suppose that, instead of half the licorice that is left each time, Lexi gives each friend 4 inches of licorice. Make a table for this situation:

| Cuts | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Amount of Licorice Left | | | | | | |

d. Make a graph of the data from part (c) on the same axes that you used on part (b).

e. How are the two graphs similar? (give at least two ways)

f. How are the two graphs different? (give at least two ways)

g. Which situation above fits a linear model? Which situation fits an exponential model?

2. Penicillin decays exponentially in the human body. Suppose you receive a 300-milligram dose of penicillin to combat strep throat. About 180 milligrams will remain active in your blood after 1 day.

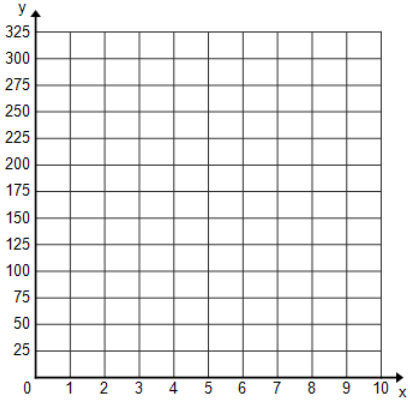
**a.** What is the decay <u>factor</u>? **b.** What is the decay <u>rate</u>?

**c.** Assume the amount of penicillin active in your blood decreases exponentially. Make a table showing the amount of active penicillin in your blood for 7 days after a 300-milligram dose.

| Day | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|
| Active Penicillin | 300 | | | | | | | |

**d.** Write an equation for the relationship between the number of days *d* since you took the penicillin and the amount of the medicine *m* remaining active in your blood.

**e.** Graph the data from the table.



Tell whether the equation represents exponential decay or exponential growth. Explain why.

3. $y = 0.8(2.1)^x$

4. $y = 20(0.5)^x$

5. $f(x) = (0.928)^x$

6. $f(x) = 14.73(6)^x$

7. $y = ½(1.1)^x$

8. $y = 300(½)^x$

Given each decay rate write the decay factor.

**9**. 20%

**10**. 15%

**11.** 5%

**12.** 70%

**13.** A poor investment was worth \$9000 in the beginning, \$7200 after the first year, and \$5760 after the second year.

**a.** What is the decay rate?

**b.** What is the decay factor?

**c.** Write an equation representing this relationship.

**d.** How much is the investment worth after 8 years?

Change is a process, not an event.

**14.** In some areas, the number of desert tortoises has decreased dramatically due primarily to human activity. In the 1950's the desert tortoise population averaged at least 200 adults per square mile. It is estimated that the population decreases by an average of 3 adult tortoises per year.

**a.** How many desert tortoises per square mile would there be after 5 years?

**b.** Write an equation representing this relationship.

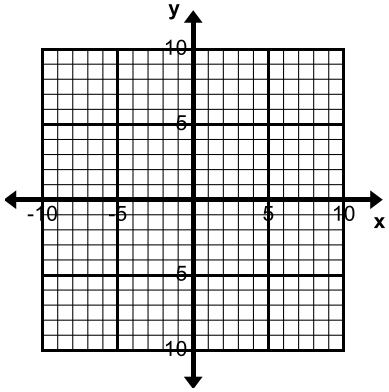
**c.** Use your equation to find how many desert tortoises per square mile would be there after 65 years.

**15.** A \$10,000 investment has a 9% ***gain*** each year. Determine the value of the investment after each of the following years.

**a.** 2 years

**b.** 10 years

**16**. Sketch a graph showing a linear relationship.




**17**. Sketch a graph showing exponential decay.