

**Homework:****Name** \_\_\_\_\_

1. State the growth factor and start value (y-intercept) for each equation:

a.  $y = 300(3^x)$

b.  $y = 300(3)^x$

c.  $y = 6,500(1.65^x)$

d.  $y = 2(7^x)$

2. If you don't brush your teeth regularly, it won't take long for large colonies of bacteria to grow in your mouth. Suppose a single bacterium lands on your tooth and starts multiplying by a factor of 4 every hour.

a. Write an equation that describes the number of bacteria  $b$  in the new colony after  $n$  hours.

b. How many bacteria will be in the colony after 7 hours? (Show your work).

c. How many bacteria will be in the colony after 8 hours? Explain how you can find this answer by using the answer from part (b) instead of the equation.

d. After how many hours will there be at least 1,000,000 bacteria in the colony? (Show your work).

e. Suppose that, instead of 1 bacterium, 50 bacteria land in your mouth. Write an equation that describes the number of bacteria  $b$  in this colony after  $n$  hours.

f. How many bacteria will there be after 9 hours? (Show your work).

3. Leaping Liang just signed a contract with a women's basketball team. The contract guarantees her \$20,000 the first year, \$40,000 the second year, \$80,000 the third year, \$160,000 the fourth year, and so on, for 10 years.

a. Does the relationship between the number of years and salary represent an exponential function? Explain.

b. Write an equation for Liang's salary  $s$  for any year  $n$  of her contract.

c. How much money will Liang earn in her 8<sup>th</sup> year? (Show your work).

4. Fruit flies are often used in genetic experiments because they reproduce very quickly. In 12 days, a pair of fruit flies can mature and produce a new generation. The table below shows the number of fruit flies in three generations of a laboratory colony.

### Growth of Fruit-Fly Population

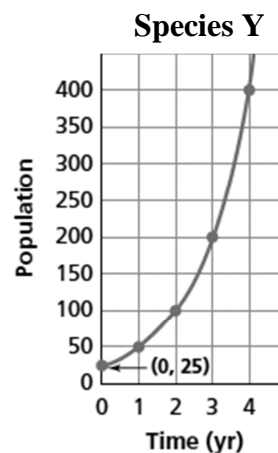
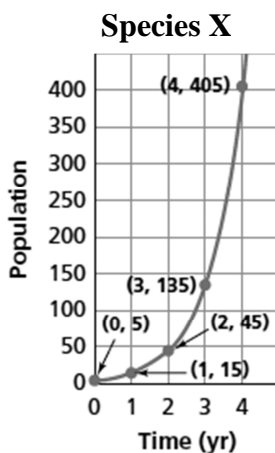
Generations	0	1	2	3
Number of Fruit Flies	2	120	7,200	432,000

- a. Does this data represent an exponential function? If so, what is the growth factor for this fruit-fly population? Explain how you found your answers.
- b. Suppose this growth pattern continues. How many fruit flies will be in the fifth generation?
- c. Write an equation for the population  $p$  of generation  $g$ .
- d. After how many generations will the population exceed one million? (Show your work).

5. The following graphs show the population growth for two species. Each graph represents an exponential function.

- a. Find the growth factors for the two species.

- b. What is the y-intercept for the graph of Species X? Explain what this y-intercept tells you about the population.



- c. What is the y-intercept for the graph of Species Y? Explain what this y-intercept tells you about the population.

- d. Write an equation that describes the growth of Species X.

- e. Write an equation that describes the growth of Species Y.

- f. For which equation is  $(5, 1215)$  a solution?