Notes: T3-50 Exp Growth & Decay Real World Date_____Period_____

Review: Growth and Decay

Determine the multiplier for each growth or decay rate (don't forget to add or subtract from 1).

1.   25% growth   2.   18% decay

3.   3% growth   4.   70% decay

5.   16% decay   6.   200% growth

- If the Percent (%) < 1, then it is Decay and the population number will go down
- If the Percent (%) > 1, then it is Growth and the population number will go up
- If the Percent (%) = 1, then there is no change and population number will stay the same.

Finding the Multiplier for the Percent Growth or Decay (straight line method)

New number:

Original Number:

Formula: $1 + \left[\dfrac{New - Original}{Original}\right]$ (don't forget to change the decimal to a percentage?)

Find the following multiplier then change it to the percentage of growth or decay.

1) New 70, Original 100   2) New 23, Original 20

3) New 53, Original 78   4) New 68, Original 68

5) If a population of rats was 10 in January and 15 in February, what is the percent growth of these rats?

6) If there are 20 foxes in the forest this year, and 21 in one year, what percent is the percent growth of the foxes?

7) Last year there were 10 raspberry plants and the population is now 19 plants, what is the annual percent growth?

The general formula for exponential growth of a population

Population =

For the following, determine the Formula then answer the question(s).

8) If the starting population of 5 rabbits grows at 200% each year, how many will there be 20 years?

9) If the starting population of 15 students in school grows at 3% each year, how many will there be 20 years?

10) A population of 100 frogs increases at an annual rate of 22%. How many frogs will there be in 5 years?

11) Using this same model for the exponential growth of the frogs, what will be the frog population in

    a) 10 years   b) 50 years

12) The population of Henderson City was 3,381,000 in 2015, and is growing at an annual rate of 1.8%. If this growth continues, what will the approximate population of Henderson City be in the year 2020.

Create a Species and Determine its rate of Growth!
Task #1) What is the name of your species/animal? _____
Task #2) At this point in time (today), what is the total
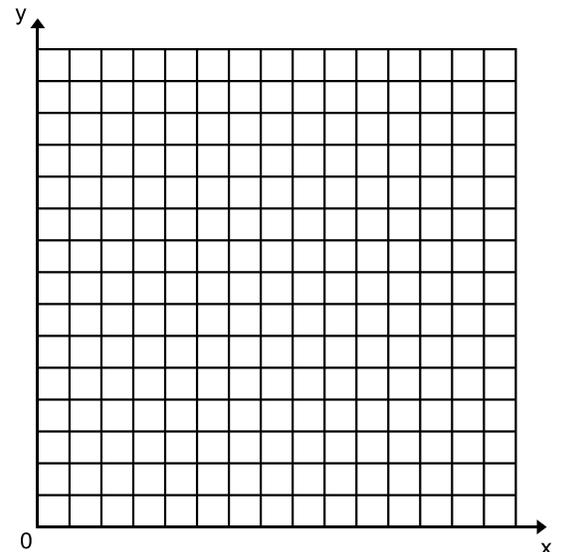   population of your species? _____
Task #3) Pick a number between 5 and 80 to be the percent
    of growth P ercent growth = ____% every month
Task #4) Write an equation that models the exponential
    growth of this species Population = _____
    Task #5) Determine what will be the population of your
    species in 1 month:_____ 2 months:_____
    6 months:_____ 1 year:_____
Task #6) Graph this exponential growth equation

y

0   x

WS: T3-50 Exp Growth & Decay Real World Date_____Period_____

Determine the multiplier for each growth or decay rate.

1. 45% growth   2.   10% decay

3. 300% growth   4.   25% decay

5. double   6.   Cut by 1/4

Find the following multiplier then change it to the percentage of growth or decay.
7) If there are 15 deer in the forest this year, and 23 in one year, what percent is the percent growth of the dear?

8) Last year there were 30 goldfish in the pond, and this year there are 40. What is the annual percent growth?

9) Last year there were 10 apes and the population is now 19, what is the annual percent growth?

10) Last year there were 280 snowboarders per day, and this year there is 310 snowboarders. How would you describe the percent 'growth' of this population?

For the following, determine the Formula then answer the question(s).

11) A type of bacteria has a very high exponential growth rate at 80% every hour. If there are 10 bacteria, determine how many there will be in 5 hours, 1 day, and 1 week?
a) 5 hours: c) 1 Week b) 1 Day 10)

12) A culture of bacteria contained 3,842,700 cells on one day and is growing at a daily rate of 6.8%. How many cells would be present 4 days later?

13) Since January 2003, the population of the city of Brownville has grown according to the mathematical model $y = 720,500(1.022)x$, where x is the number of years since January 2010.
a) Explain what the numbers 720,500 and 1.022 represent in this model

What will be the population of Brownsville in the years 2025, 2035, and 2060?
   b) 2025:   c) 2035:   d) 2060:

14) A species of extremely rare, deep water fish has an extremely rarely have children. If there are a 821 of this type of fish and their growth rate is 2% each month, how many will there be in half of a year, in 10 years and 100 years?
   a) Half a year   b) 10 years   c) 100 years

15) The population of Henderson City was 3,381,000 in 2010, and is growing at an annual rate of 1.8%. If this growth continues, what will the approximate population of Henderson City be in the years 2020, 2030, and 2050?
   a) 2020:   b)2030:   c)2050: