H. Math 3                                    Name: _____

**HW Exponential Growth/Decay**

**I.** Identify each function as modeling either exponential growth or exponential decay.  What is the function's percent increase or decrease?

1.  $y = 1298(1.63)^x$             2.  $y = 0.65(1.3)^x$             3.  $y = 2(0.65)^x$

4.  $12(1.7)^x$                    5.  $y = 5(6)^x$              6.  $y = \frac{4}{5}(0.45)^x$

**II.** Write an exponential function to model each situation.  Find the value of the function **after 5 yrs.**

7. A population of 250 frogs increases at an annual rate of 22%.

8. A stock priced at $35 increases at a rate of 7.5% per year.

9. A $17,500 delivery van depreciates 11% each year.

10. A population of 115 cougars decreases 1.25% each year.

**III.** Solve

11. On their federal income tax returns, many self-employed individuals can depreciate the value of the business equipment they purchase.  Suppose a computer valued at $6500 depreciates at a rate of 14.3% per year.  After how many years is the value of the computer less than $2000?

12. Which function represents exponential growth?

   A.  $y = 35x^{1.35}$                      C. $y = 35(0.35)^x$

   B.  $y = 35(1.35)^x$                     D. $y = 35 \div (1.35)^x$

13. Iodine-131 is used to find leaks in water pipes. It has a half-life of 8.14 days. Write the exponential decay function for a 200-mg sample. Find the amount of iodine-131 remaining after 72 days.

14. You have inherited land that was purchased for $35,000 in 1980. The value of the land increased by approximately 5% each year.

    a) Write a model for the value of the land x years after 1980.

    b) What is the approximate value of the land this year?

    c) After what year will the land be valued at about $200,000?

15. The amount g(in trillions of cubic feet) of natural gas consumed in the United States from 1940 to 1970 can be modeled by:
$$g = 2.91(1.07)^t$$
where $t$ equals the number of years since 1940.

    a)    Identify the:

        -initial amount

        -the growth factor

        -annual percent increase

    b) Estimate the natural gas consumption in 1955.

    c) What year was the consumption about 15.8 trillion cubic feet?

16. In 1980 wind turbines in Europe generated about 5 gigawatt-hours of energy. Over the next 15 years, the amount of energy increased by about 59% per year.

    a)    Write a model giving the amount $E$ (in gigawatt-hours) of energy $t$ years after 1980.

    b)    About how much wind energy was generated in 1984?

    c)    Estimate the year when 8- gigawatt-hours of energy were generated?