Exponential Growth and Decay Models Practice

**Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

Exponential **Decay** can be modeled by the formula

 $y=a(1-r)^{t}$

Exponential **GROWTH** can be modeled by the formula

 $y=a(1+r)^{t}$

**y = ending amount a = starting amount**

**t = time r = interest rate (in decimal form)**

**Determine whether each of the following is an application of growth or decay, then solve, rounding appropriately.**

1. Your grandparents purchased an acre of ocean front property in Panama City in 1960 for $1800. If the value of the land has appreciated at an average rate of 11% each year, what is the value of the land today?
2. In 1972, your Dad purchase his first car, a canary yellow Camaro, for $2600. The car has depreciated at a rate of approximately 8.5% each year. What is the value of the car today?
3. A car valued at $14,900 today has depreciated at an average rate of 7.6% each year. If the car was purchased in 2001, estimate its purchase price.
4. In 1999, Edna invested $5000 into an account whose balance today is $9075.37. What is the interest rate she is earning on the account?
5. A construction company purchased a piece of heavy equipment in 2008. The equipment is now worth only half its purchase price. At what rate did the equipment diminish in value?
6. A car purchased in the year 2000 is now considered to be worth 33% of its purchase price. What is the depreciation rate of the car?
7. A tricked out hummer purchased for $68,000 in 2004 has a *Blue Book* value of $27,000 today. Estimate the depreciation rate of the vehicle.
8. A valuable painting was sold last week at auction for 20 times its purchase price in 1980. Estimate the appreciation rate of the painting?
9. A colony of bacteria doubles in 6 hours. What is its growth rate?
10. What is the depreciation rate of a laptop computer if it is worth 25% less than its purchase price after 6 months?
11. The Giant Panda population is shrinking. In 1976, there were an estimated 6200 Pandas remaining in the world.
12. If the population has decreased at a rate of approximately 12% each year, approximately how many Pandas remain in the world today?
13. Approximately how many Pandas can we expect to have in the year 2050?

**Do the following functions represent growth or decay? Graph and analyze.**

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| 12. f(x) = -(2) x + 2 - 3 Growth or Decay? Domain: \_\_\_\_\_\_\_\_\_\_\_\_\_Range: \_\_\_\_\_\_\_\_\_\_\_\_\_Asymptote: \_\_\_\_\_\_\_\_\_\_\_\_\_

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| $$x$$ | $$f\left(x\right)$$ |
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| $$x$$ | $$f\left(x\right)$$ |
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13. f(x) = ($\frac{1}{3}$) x - 3  + 5 Growth or Decay?Domain: \_\_\_\_\_\_\_\_\_\_\_\_\_Range: \_\_\_\_\_\_\_\_\_\_\_\_\_Asymptote: \_\_\_\_\_\_\_\_\_\_\_\_\_ |