9.6H Growth and Decay Name:_____Per: _____

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Determine the common ratio (sometimes called the multiplier) for each growth or decay rate.

1. 5% growth
2. 12% decay
3. 98% decay
4. 1% decay
5. 300% growth
6. 0.85% growth

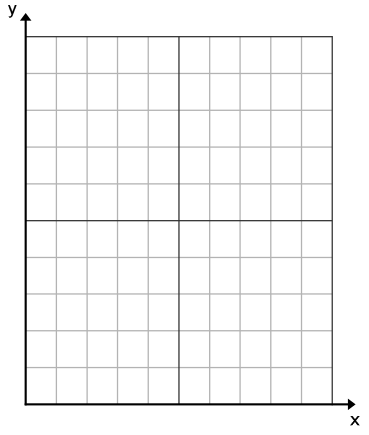
For the following, write an equation and then calculate the expected price in the year **2008** if you assume that there was a **9% increase inflation rate** and the given price is from **1998**.

7. Big Mac, \$1.85
   a. Equation:_____
   b. Expected price: _____
8. Movie Admission, \$5.00
   a. Equation: _____
   b. Expected price:_____
9. Monthly rent, \$400
   a. Equation:_____
   b. Expected price: _____
10. Small Car, \$6,000
    a. Equation: _____
    b. Expected price: _____

Answer the following.

11. $f(x) = 3(0.75)^x$
    CIRCLE: Growth OR Decay
    Initial amount or $f(0)$ _____
    Multiplier (or *r*) _____
    Find $f(3) =$ _____
    What is the percent of growth/decay _____
12. $f(x) = 1.5(1.01)^x$
    CIRCLE: Growth OR Decay
    Initial amount _____
    Multiplier _____
    Find *f(1)*= _____
    What's the percent of growth/decay _____

13. You buy a new computer for \$2,100 and you used your Best Buy credit card at 24% compound annual interest.
    a. CIRCLE: Growth OR Decay
    b. What is the initial amount _____
    c. What is the multiplier (common ratio) _____
    d. Make a table for $f(0), f(1), f(2)$ and $f(3)$



    e. Graph the above table on the grid to the right.
    f. Write an explicit equation for t years. _____
    g. What is the cost of the loan after 14 years? _____

14. In 2013 Robyn's mom bought her an iPhone 4 for \$299. Now it's been five years and Robyn's phone is seriously out of date. Robyn decides to sell the phone on KSL and needs to figure out a fair price so she assumes it depreciated at a rate of 16.5% per year.
    a. Write an explicit equation to calculate the worth of her phone. _____
    b. What is her phone worth this year?_____
    c. How much will the phone be worth in 2020 if Robyn keeps the phone? _____

Solve the following problems.

15. E. coli bacteria double in population every thirty minutes. If the initial population is 85.
    a. Write an Explicit Eq: _____ b. Write a Recursive Eq:_____
    c. What is the population of bacteria after three hours? _____ After one day? _____

16. You decide to deposit $5,000 at 24% compound interest per year.
    a. Write an Explicit Eq: _____ b. Write a Recursive Eq:_____
    c. How much will you have after one year?_____ Three years?_____
    d. Write the explicit equation if the yearly interest rate of 24% is compounds monthly.
    e. How will this change the amount of interest that you earn?_____

17. The population of Bloom Falls, Mass. (population 937) is slowly increasing by 4.5% each year.
    a. Write an Explicit Eq: _____ b. Write a Recursive Eq:_____
    c. What is the population after 3 years? _____

18. You bought a Boston Whaler in 2004 for $12,500. The boat's value depreciates by 7% a year.
    a. Write an Explicit Eq: _____ b. Write a Recursive Eq:_____
    c. How much is the boat worth now (2018)? _____
    d. What will it be worth in 2020?_____

19. The sloth is trying to get to fruit that is 20 feet away. Each day the sloth gets 50% closer to the fruit.
    a. Write an Explicit Eq: _____ b. Write a Recursive Eq:_____
    c. How close will the sloth be in 3 days? _____
    d. How many days until the sloth arrives at the fruit._____Explain:_____
    _____

Many types of items **depreciate** in value with time like the value of your car or the value of the phone in your pocket. If you purchased the following items in **2007** for the price listed below and **assuming 9% depreciation per year**. Answer the following.

20. Cell phone: $550.00
    a. Recursive Equation:_____
    b. Explicit Equation: _____

21. Used car: $8000.00
    a. Recursive Equation:_____
    b. Explicit Equation: _____

22. How much would the phone from above be worth this year? _____

23. How much would the car be worth this year?_____

24. When will the cell phone be worth $0? _____. Explain: _____

Given the same circumstances as above, answer the following if they depreciated by **13.5% per year**.

25. Cell phone: $550.00
    a. Explicit Equation: _____
    b. How much would the phone be worth this year? _____

26. Used car, $8000.00
    a. Explicit Equation:_____
    b. How much would the car be worth this year? _____