

# 8D Exponential Growth and Decay

Name: \_\_\_\_\_ Per: \_\_\_\_\_

SHOW YOUR WORK FOR FULL CREDIT. NO WORK, NO CREDIT. NO WORK IN PEN.

- Given \$100, show what would happen if you multiply the amount by the following percentages.
  - 15%
  - 80%
  - 100%
  - 150%
  - 200%
- Explain which of the above makes the \$100 grow and why: \_\_\_\_\_
- Determine the **common ratio** (sometimes called the multiplier) for each growth or decay rate.
  - 5% growth
  - 12% decay
  - 30% growth
  - 98% decay
  - 1% decay
  - 30% decay
  - 0.85% growth
  - 2.5% decay

- $f(x) = (0.5)3^x$ 
  - CIRCLE: Growth OR Decay
  - Initial amount \_\_\_\_\_
  - Common Ratio/multiplier \_\_\_\_\_
  - Find  $f(3) =$  \_\_\_\_\_

- $f(x) = 2.25^x$ 
  - CIRCLE: Growth OR Decay
  - Initial amount \_\_\_\_\_
  - Common Ratio/multiplier \_\_\_\_\_
  - Find  $f(-3) =$  \_\_\_\_\_

E.C. What's the percentage of decay/growth? \_\_\_\_\_

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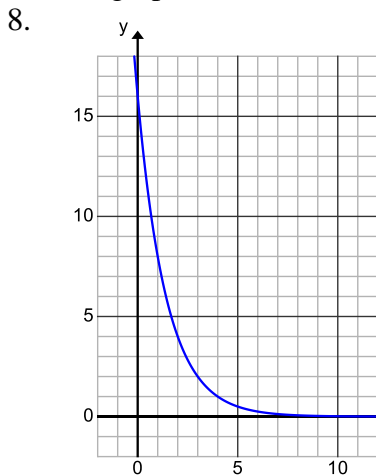
- $f(n) = 2(1.01)^n$ 
  - CIRCLE: Growth OR Decay
  - Initial amount or  $f(0)$  \_\_\_\_\_
  - Common Ratio/multiplier \_\_\_\_\_
  - Find  $f(2) =$  \_\_\_\_\_

- $f(n) = 1.25(0.033)^n$ 
  - CIRCLE: Growth OR Decay
  - Initial amount \_\_\_\_\_
  - Common Ratio /multiplier \_\_\_\_\_
  - Find  $f(1) =$  \_\_\_\_\_

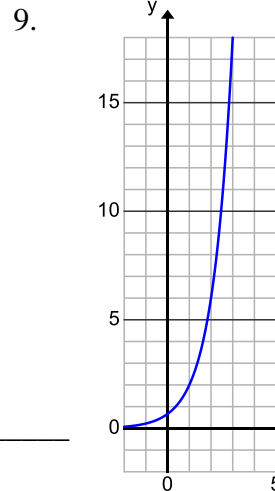
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Use the graph to answer the following questions. You might want to make a table ☺



- Growth OR Decay  
 Initial amount \_\_\_\_\_  
 Common Ratio \_\_\_\_\_  
 Find  $f(2) =$  \_\_\_\_\_  
 Recursive Eq: \_\_\_\_\_  
 Explicit Eq: \_\_\_\_\_  
 E.C. % decay/growth? \_\_\_\_\_



- Growth OR Decay  
 Initial amount \_\_\_\_\_  
 Common Ratio \_\_\_\_\_  
 Find  $f(1) =$  \_\_\_\_\_  
 Recursive Eq: \_\_\_\_\_  
 Explicit Eq: \_\_\_\_\_  
 E.C. % \_\_\_\_\_

10. Write an **explicit equation** and then calculate the expected price in the year 2018 if you assume 4% annual increase starting with the given price in 1988.

a. Big Mac, \$1.29

Equation: \_\_\_\_\_

Expected price: \_\_\_\_\_

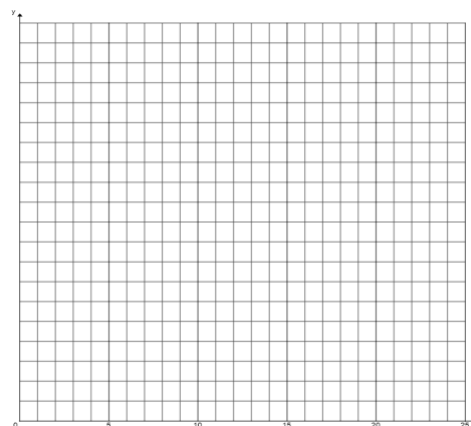
b. Movie Admission, \$5.00

Equation: \_\_\_\_\_

Expected price: \_\_\_\_\_

11. E. coli bacteria double in population each hour and has an initial population of 85.

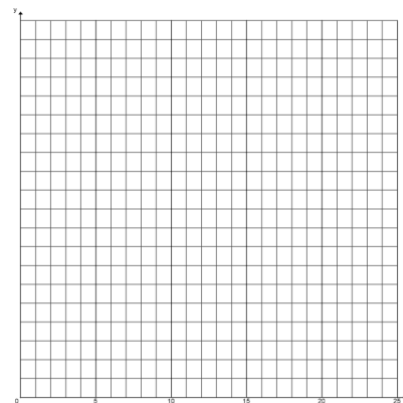
$h$	Pattern	$f(h)$	S.H.
0			
1			
2			
3			



- Complete the table.
- What is the initial amount or  $f(0)$ ? \_\_\_\_\_
- Is this an Arithmetic OR Geometric sequence? \_\_\_\_\_
- What is the multiplier/common ratio? \_\_\_\_\_
- Graph your table to show the growth of the bacteria.
- What is the explicit equation? \_\_\_\_\_ g. What is the recursive equation? \_\_\_\_\_
- What's the population of bacteria after three hours? \_\_\_\_\_
- Find  $f(10) =$  \_\_\_\_\_ What does it mean? \_\_\_\_\_

12. Strapped for cash, you decide to borrow \$5,000 from a local crime lord at an interest rate of 32% yearly.

- What is the initial amount? \_\_\_\_\_
- What is the multiplier/common ratio? \_\_\_\_\_
- Make a table to show how much you will OWE each year.



- Graph your table to show the growth of the loan
- Write the explicit equation. \_\_\_\_\_
- Write the recursive equation. \_\_\_\_\_
- How much will you owe after three years? \_\_\_\_\_
- What is  $f(5) =$ ? \_\_\_\_\_ What does it mean? \_\_\_\_\_

13. You bought a Boston Whaler in 2004 for \$12,500. The boat's value depreciates (decay's) by 7.5% a year

- What is the initial amount? \_\_\_\_\_
- What is the multiplier/common ratio? \_\_\_\_\_
- Is this an example of growth OR decay? \_\_\_\_\_ How can you be sure? \_\_\_\_\_
- Write an explicit equation. \_\_\_\_\_
- Write a recursive equation. \_\_\_\_\_
- How much would the boat be worth in 2008? \_\_\_\_\_
- What about in 2020? \_\_\_\_\_
- When will the value of the boat reach \$0? \_\_\_\_\_ Explain: \_\_\_\_\_

14. Solve for r:  $3(r^2 + 10) = 393$