

# 9D Exponential Growth and Decay

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

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

1. Given \$100, show what would happen if you multiply the amount by the following percentages.  
 a. 15%                      b. 80%                      c. 100%                      d. 150%                      e. 200%

2. 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.

3. 5% growth                      5. 30% growth                      7. 1% decay                      9. 0.85% growth  
 4. 12% decay                      6. 98% decay                      8. 30% decay                      10. 2.5% decay

11.  $f(x) = (0.5)3^x$   
 CIRCLE: Growth OR Decay  
 Initial amount \_\_\_\_\_  
 Multiplier \_\_\_\_\_  
 Find  $f(3) =$  \_\_\_\_\_

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

12.  $f(x) = 2.25^x$   
 CIRCLE: Growth OR Decay  
 Initial amount \_\_\_\_\_  
 Multiplier \_\_\_\_\_  
 Find  $f(-3) =$  \_\_\_\_\_

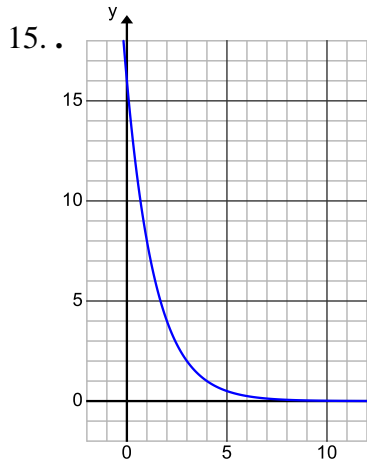
E.C. What's the percentage of decay/growth? \_\_\_\_\_

13.  $f(n) = 2(1.01)^n$   
 CIRCLE: Growth OR Decay  
 Initial amount \_\_\_\_\_  
 Multiplier \_\_\_\_\_  
 Find  $f(2) =$  \_\_\_\_\_

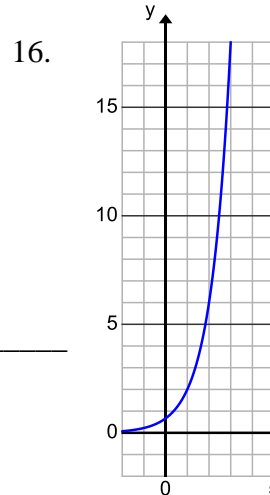
E.C. What's the percentage of decay/growth? \_\_\_\_\_

14.  $f(n) = 1.25(0.033)^n$   
 CIRCLE: Growth OR Decay  
 Initial amount \_\_\_\_\_  
 Multiplier \_\_\_\_\_  
 Find  $f(1) =$  \_\_\_\_\_

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



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



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

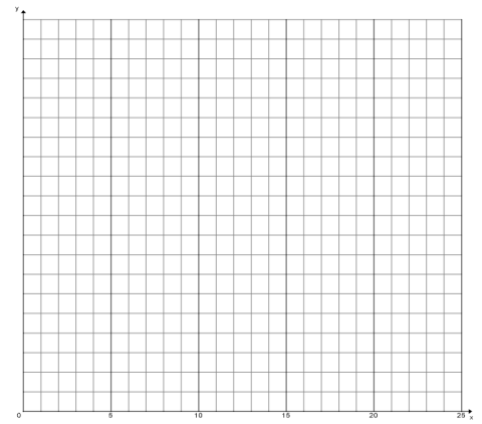
17. Write an **explicit equation** and then calculate the expected price in the year 2018 if you assume 9% annual increase starting with the given price in 1988. SYW.

- a. Big Mac, \$1.29  
 Equation: \_\_\_\_\_  
 Expected price: \_\_\_\_\_  
 c. Monthly rent, \$400  
 Equation: \_\_\_\_\_  
 Expected price: \_\_\_\_\_

- b. Movie Admission, \$5.00  
 Equation: \_\_\_\_\_  
 Expected price: \_\_\_\_\_  
 d. Small Car, \$6,000  
 Equation: \_\_\_\_\_  
 Expected price: \_\_\_\_\_

18. E. coli bacteria double in population each hour and has an initial population of 85.  
Complete the table and graph.

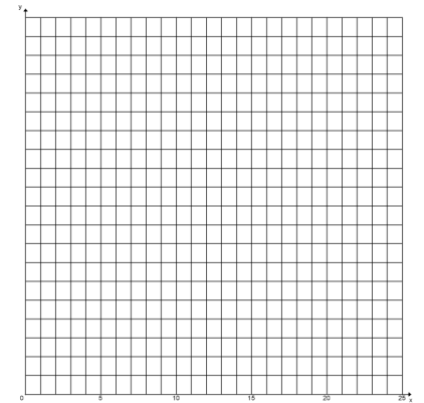
x	Pattern	$f(x)$	S.H.
0			
1			
2			
3			



- What is the explicit equation? \_\_\_\_\_
- What is the recursive equation? \_\_\_\_\_
- What's the population of bacteria after three hours? \_\_\_\_\_
- Use your equation and find  $f(10) =$  \_\_\_\_\_
- What does  $f(10)$  mean? \_\_\_\_\_

19. Strapped for cash, you decide to borrow \$5,000 from a local crime lord at an interest rate of 32% yearly.  
How much will you pay each year if you don't want your knees broken?

- Make a table
- Graph



- Write the explicit equation. \_\_\_\_\_
- Write the recursive equation. \_\_\_\_\_
- How much would you owe after one year? \_\_\_\_\_
- What about after three years? \_\_\_\_\_
- What is  $f(5)$ ? \_\_\_\_\_

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

- Write an explicit equation. \_\_\_\_\_
- Write a recursive equation. \_\_\_\_\_
- How much would the boat be worth in 2008? \_\_\_\_\_
- What about now? \_\_\_\_\_
- What will it be worth in 2020? \_\_\_\_\_
- Does your answer make sense? \_\_\_\_\_ Why or why not? \_\_\_\_\_

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

22. Solve for s:  $hs + r = m$