

# REVIEW

## Unit 4 Exponential Functions Test

### I. Tell if the functions below represent growth or decay.

1.  $y = 5.6^x$

2.  $y = \frac{3}{4} \cdot \left(\frac{2}{3}\right)^x$

3.  $y = \left(\frac{9}{2}\right)^x$

1.

2.

3.

### II. Complete the table below.

Function	Initial Value	Growth/Decay FACTOR	Growth/Decay RATE
4. $y = 78(1.02)^t$			
5. $y = 56(.87)^t$			
6. $y = 4^x$			
7. $y = 65(1.35)^t$			

### III. Growth and Decay Models: for each problem, write a function that models the situation. Then find the value for the time given.

8. A condo in Atlanta was worth \$95,000 in 1990. The value of the condo increased by an average rate of 4% each year. Find the value of the condo in 2008.

9. The population of a small town is 9000. The population is decreasing at a rate of 2.5% per year. Find the population of the town after 30 years. Round to the nearest whole number.

10. Eleven students at a high school passed the Calculus AP exam in 2000. The number of students who passed the test increased 14% per year. Find the number of students who passed the test in 2006. Round to the nearest whole number.

11. Maggie buys a car for \$21,500. It depreciates 11% each year. Find the value of the car after 7 years.

12. The annual sales at a restaurant are \$750,000. The sales decrease at a rate of 5% each year. Find the amount of sales after 7 years.

13. In a small area on the Monterey Peninsula, there were 50 sea otters. They had an annual growth for 16%. Find the number of otters after 7 years. Round to the nearest otter.

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**IV. Half-life problems: Write a function, then find the solution for the given time.**

14. The half-life of Iodine-131 is approximately 12 days. Write a model if you have a 200 gram sample, then find the amount remaining after 84 days.

15. The half-life of Anders-48 is 80 days. How much of an 500 gram sample would remain after 480 days? Write a model and solve.

**V. Compound interest:**  $A = P \left(1 + \frac{r}{n}\right)^{nt}$

16. Dan invested \$12,000 at a rate of 8% compounded monthly. Find the value after 9 years.

17. Jan invested \$23,000 at a rate of 6% compounded quarterly. Find the value after 11 years.

18. Stan invested \$5500 at a rate of 13% compounded semi-annually. Find the value after 50 years.

**VI. Solving equations. Write each side of the equation with the same base and solve.**

19.  $2^{6x+18} = 8^{5x}$

20.  $3^{12x} = 3^{2x+75}$

21.  $5^{2x+5} = 125$

**VII. Using the parent function of  $y = 2^x$ , write a new function with the transformations.**

22. Vertical stretch by a factor of 6, down 3

23. Up 9, right 4

24. Reflected over the x-axis, left 2, up 7

**VIII. Exponential function key features**

25. Write an equation of the asymptote for the following function:  $y = 2 \left(\frac{1}{2}\right)^x + 3$

26. State the end behavior of the function in problem #25.

27. State the range of the function in problem #25.

**IX. Quadratics Review**

28. Tiger woods hits his golf ball out of the sand trap with an initial velocity of 65 ft/sec. This is modeled by the function:  $h(t) = -16t^2 + 65t$ . Find the maximum height of the ball.

29. For the problem above, how long until the ball hits the ground?

30. Find the vertex, axis of symmetry and range of the given function:  
 $y = -(x - 9)^2 + 2$

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<u>26.</u> As $x \rightarrow +\infty$ , $y \rightarrow$ As $x \rightarrow -\infty$ , $y \rightarrow$
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<u>30.</u> Vertex
AOS Equation
Range: