

First & Last Name: \_\_\_\_\_ Period: \_\_\_\_ ID: A

**Directions:** Show all thinking in a clear manner for maximum credit. You may use a calculator and each question is worth five points unless noted otherwise.

*"If you tell the truth, you don't have to remember anything." - Mark Twain*

### GGG Unit Test (Mazzeo 2013)

**Short Answer** Simplify the following expressions by either expanding all the way out or by using the exponent properties.

1.  $\left(2eg^2\right)^3\left(-4e^2g\right)$

.

2. (10 points)  $\frac{-4c^3d}{-c^2} \cdot \frac{-12cd^4}{\left(4c^3\right)^2}$

.

3. (10 points)  $\frac{7t^{-3}u}{-5t} \cdot \frac{-10t^5u^{-2}}{3t^{-1}u^{-4}}$

4. (15 points)  $\frac{q^2(2qr^2)^{-2}}{q^3r} \cdot \frac{r^{-4}(4q^2r^3)^2}{3q^{-1}r^{-2}}$

.

5. After  $t$  years, an initial population  $P$  has grown to  $P(1+r)^t$ . If the population *at least doubles* during the first year, which of the following are possible values of  $r$ ? Briefly explain. (10points)

(a.)  $r = 2\%$

(b)  $r = 50\%$

(c)  $r = 100\%$

(d)  $r = 200\%$

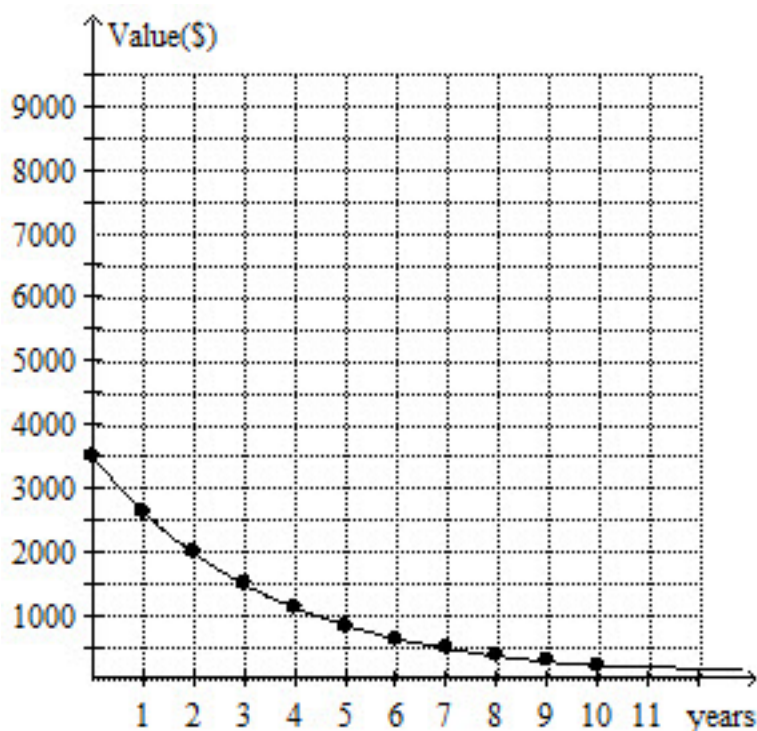
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6. Prices are *increasing* at a rate of 5% each year. What is wrong with the statements below? Correct the formula in the statement.

(a) A \$6 item costs  $\$(6 - 1.05)^7$  in 7 years' time.

(b.) A \$3 item costs  $\$3(0.05)^{10}$  in ten years' time.

7. Write the *approximate* exponential equation for the graph below.



8. The active ingredient in a chemical solution used to control insects *decays exponentially* with time by a rate of 8% every hour. If there are  $296.24\text{mg}$  at the end of 2 hours, then write an equation to model this situation for  $C$ , chemical solution, and  $h$ , hours. (10points)

9. Carlos raises fuzzy insects called tribetts. The following table shows the decrease in the population of tribetts every year. The relationship between the number of years and the tribett population is approximately exponential. (note some of the numbers may have been rounded)

number of years	0	1	2	3	4	5
<i>number of tribetts</i>		13,280	11,022	9,149	7,593	6,302

a.) What is the decay rate for this relationship? How do you know?

b.) Write an equation for the relationship between the number of years and the number of tribetts.

c.) Explain what information the numbers and variables in your equation represent *in the context of this situation*.

10. Write the results in *both standard and scientific notation form*.

a.)  $345,000 \cdot 623,000$

b)  $(7 \times 10^5)(9 \times 10^8)$

.

11. Bonus: In the equations below the solution depends on the constant  $a$ , Assuming  $a$  is positive, what is the effect of increasing  $a$  on the solution? Does it increase, decrease, or remain unchanged? Give a reason for your answer that can be understood without solving the equations.

(a)  $x - a = 0$

(b)  $ax = 1$

(c)  $ax = a$

(d)  $\frac{x}{a} = 1$

**GGG Unit Test (Mazzeo 2013)**  
**Answer Section**

**SHORT ANSWER**

1.  $-32e^5g^7$
2.  $\frac{-3d^5}{c^4}$
3.  $\frac{14t^2u^3}{3}$
4.  $\frac{4q^2r}{3}$
5. (explanations will vary) c and d
6. (explanations will vary) (a)  $\$6(1.05)^7$  (b)  $\$6(1.05)^{10}$
7.  $y \approx 3500(0.76)^x$
8. students will need to show how start value found  $C = 350(0.92)^h$
9. (a) 17% decay rate  
 (b)  $T = 16000(0.83)^y$   
 (c) T= # of tribetts, 16,000 starting # of tribetts, 0.83 decay factor, y= # of years
10. a.)  $2.14935 \times 10^{11}$  and 214,935,000,000... b.)  $6.3 \times 10^{14}$  and 630,000,000,000,000
11. (explanations will vary) But all should have something along the lines of 'As  $a$  increases...'  
 (a)  $x$  increase (b)  $x$  decreases (c)  $x$  unchanged (d)  $x$  increases