

**Algebra 2: Chapter 6 and Semester Test Review**

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

**Complete problems on a separate sheet of paper. Show work and circle answers.**

- 1) 100 bacteria are present in a glass of milk. The bacteria grow and divide once every hour.
  - a. Write a function for the number of bacteria as a function of time.
  - b. How many bacteria are present after 4 hours?
  - c. Now assume the population starts declining by 11% each hour; Write a function for the number of bacteria as a function of time (now, the initial population is based on part b).
  - d. How long until only 10 bacteria survive?
- 2) Convert between logarithmic and exponential form.

a.  $e^{2x} = 113$                       b.  $10^4 = 10,000$                       c.  $\log_7\left(\frac{1}{49}\right) = -2$

- 3) Write each expression as a single log.

a.  $2\log(x) - 4\log(y)$                       b.  $\log_2(4) + \log_2(6) + 1$

**Solve the following for x. Circle answers. Round answers to the nearest hundredth.**

- 4)  $\log_5 x = -3$
- 5)  $e^x = 8$
- 6)  $\log_{12}(7x + 3) = \log_{12}(5 - x^2)$
- 7)  $\ln(e^{2x}) + 5\log_2(2^x) = 7$
- 8)  $\log_2 13 + \log_2 7 = \log_2 m$
- 9)  $\log_x(20) = 5$
- 10)  $\ln(4x + 3) = -2$
- 11)  $4 + 5^{3x-1} = 231$

**Solve the following problems using:**     $A = P\left(1 + \frac{r}{n}\right)^{nt}$                       or                       $y = y_0e^{kt}$                       or                       $P = P_0 \cdot (1+r)^t$

- 12) Determine whether Sean can buy a used car costing \$2,500 with a \$1,000 dollar investment that his grandparents made for him 20 years ago, with an interest rate of 7% compounded monthly.
- 13) A piece of office equipment valued at \$25,000 depreciates at a steady rate of 10% annually. In how many years will it be worth \$5000?

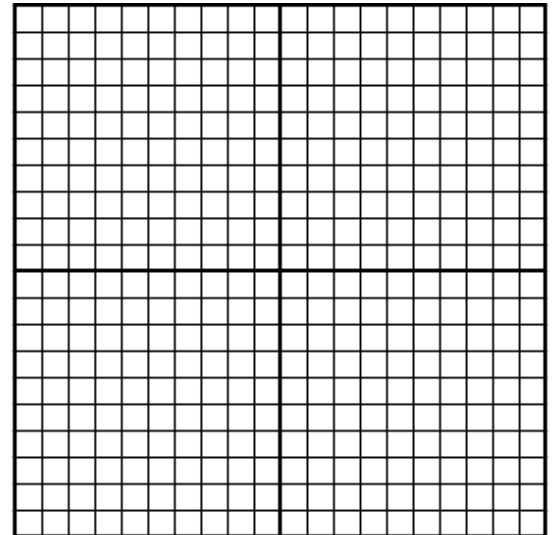
14) Fill out the following information, then graph and label the lines on the provided plot.

<b>Line A</b>	<b>Line B</b>	<b>Line C</b>
$y = \frac{3}{2}x - 2$	$y = 5$	$x = -3$

Slope: \_\_\_\_\_

Y-intercept: \_\_\_\_\_

Horizontal/Vertical?      N/A      \_\_\_\_\_



15) Solve the system of equations

$$x - 3y = 6$$

$$5x + 6y = -12$$

16) Fill in the following table

x	-3	-2	-1	0	1	2	3
f(x)	2	1	0	-1	-2	3	-3
g(x)	-2	-1	-4	-2	-1	2	-3
(f+g)(x)							
f(x)*g(x)							
2f(x)-3							
g(f(x))							
g(x-1)							

17) Solve the quadratic equation

$$x - 6 = x^2 - 3x - 27$$