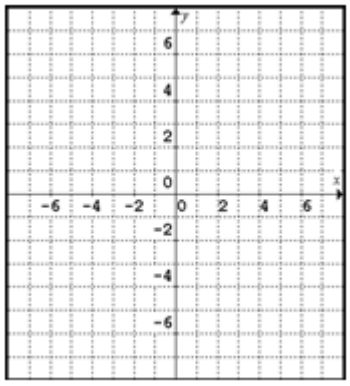
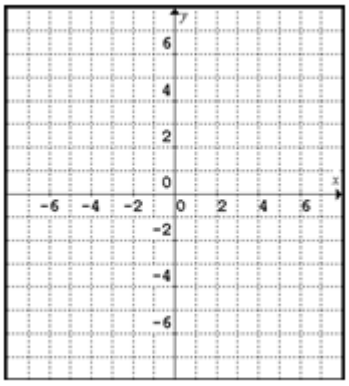
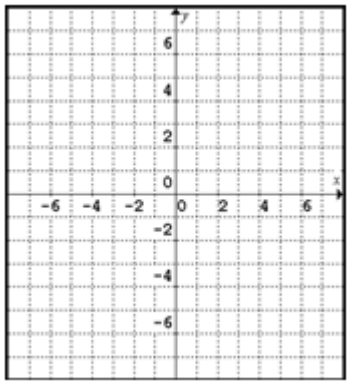
Name: _____ **Class Period:** _____ **Date:** _____

Algebra 2 **Topic 6 Review WS**

1. Sketch each graph, showing *at least* 3 points and its asymptote. Then answer the questions. ***NC***

a. $f(x) = -3 \cdot 2^{x+1} + 4$	**b.** $g(x) = 6\left(\frac{1}{2}\right)^{x+3}$	**c.** $h(x) = 2 \cdot 3^{-(x-4)} - 6$
		
Transformations:	**Transformations:**	**Transformations:**
Domain:	***y*-intercept:**	***x*-intervals where** $h(x) > 0$
Range:	**Range:**	***x*-intervals where** $h(x) < 0$
***y*-intercept:**	**End Behavior:**	**Asymptote:**

2. Multiple Choice. Which of the following models an account value, $A(t)$, after t years where the annual percent rate (APR) is 6.7%, the principal is \$3,050, and the account is compounded quarterly?

[A] $A(t) = 3,050(1 + 0.067)^{4t}$

[B] $A(t) = 3,050\left(1 + \frac{0.67}{4}\right)^{4t}$

[C] $A(t) = 3,050\left(1 + \frac{0.067}{4}\right)^{t}$

[D] $A(t) = 3,050\left(1 + \frac{0.067}{4}\right)^{4t}$

3. Assume that 2,200 students attended IHS in 2014 and 2,450 students attended IHS in 2017. Write the equation of a function $f(x) = a \cdot b^x$ that models the number of students attending IHS, $f(x)$, x years since 2010. Use your equation to find the growth rate, expressed as a percent and rounded to 3 decimals.

4. Evaluate each logarithm. ***NC***

a. $\log_8 \frac{1}{64}$ **b.** $\log_{125} 5$ **c.** $\log 1{,}000{,}000$

d. $\log_7(-7)$ **e.** $\log_2 1$ **d.** $\log_9 9^{12}$

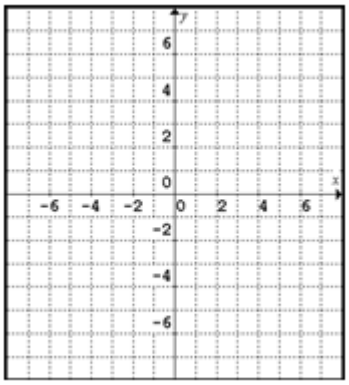
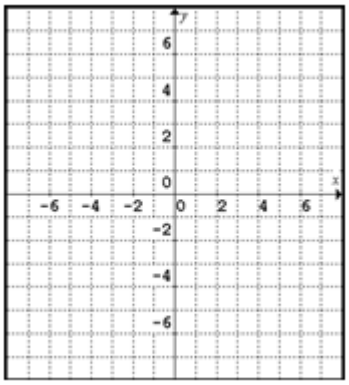
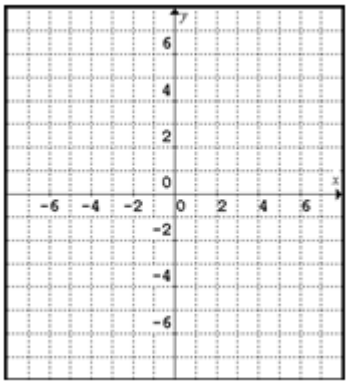
5. Find the value of each logarithm rounded to three decimal places. ***C***

a. $\log_3 85$ **b.** $\log_{36} 5$ **c.** $\log_{4.2} 0$

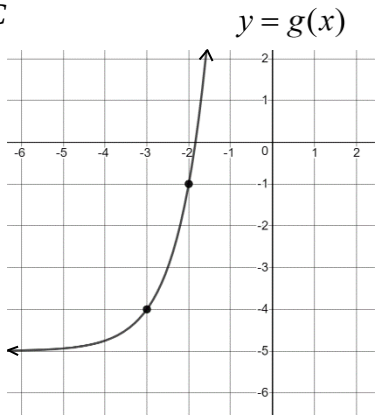
6. Solve the equations below, expressing your answer as a *simplified fraction* or *integer*. ***NC***

a. $27^{3x+1} = 81^{x-3}$ **b.** $3\log\left(\frac{4}{x}\right) = 6$ **c.** $\log_4 2 + 8x = \log_2 1 - 4.5$

7. Graph each logarithm, showing *at least* two points and its asymptote. Then answer the questions. ***NC***

a. $f(x) = 4\log_2(-(x-6))$	**b.** $g(x) = \log_5(x+4) - 3$	**c.** $h(x) = -4\log_3(x+2) + 5$
		
End Behavior:	**End Behavior:**	**End Behavior:**
Transformations:	**Transformations:**	**Transformations:**

8. The function $y = g(x)$ (shown to the right) is a transformation of $f(x) = 4^x$. ***NC***



a. Assuming only translations were applied, write the equation of $g(x)$.

b. Using properties of inverses, graph $g^{-1}(x)$ and its asymptote.

c. Using your answer from part (a), find the equation for $g^{-1}(x)$. Verify your equation is accurate by testing points from part (b) into your equation.

9. Compute the value of each sum below. In questions (b) and (c), classify as convergent or divergent. ***C***

a. $\sum_{n=1}^{10} 4(1.3)^{n-1}$ **b.** $\sum_{n=1}^{\infty} -2\left(\frac{3}{5}\right)^{n-1}$ **c.** $\sum_{n=1}^{\infty} 5\left(\frac{7}{4}\right)^{n-1}$

10. The half-life of carbon-14 is 5,730 years. This is the amount of time it takes for half of a sample to decay. From a sample of 24 grams of carbon-14, how long will it take until only 3 grams of the sample remain? *Hint: find how many half-lives occurred, then use this to compute the total number of years.* ***C***

11. How many terms are in the geometric series $2.1 + 10.5 + ... + 820,312.5$? ***C***

12. A hurricane center uses the function $s = 95\log d + 75$ to relate the wind speed in miles per hour, s, and the distance in miles a hurricane travels, d. How many miles will a hurricane travel with a wind speed of approximately 320 mph? ***C***

Additional Application Problems

13. Darren wants to invest $4,500 into an account that earns 5% annual interest. Help him see how much each account below would earn after 10 years if it is compounded according to the period listed. ***C***

Compounding Period	Use the Compound Interest Formula	Account Value
Annually		
Quarterly		
Monthly		
Daily		

14. A professor was interested in the relationship between time and memory. The professor determined the model $f(t) = t_0 - 15\log(t+1.1)$ gives the memory score after t months when a student had an initial memory score of t_0. ***C***

a. Write a model for a student with an initial memory score of 95.

b. After how many *years* will the student from part (a) have a memory score of 65? Round to the nearest year.

15. The pH of a solution is a measure of its concentration of hydrogen ions. This concentration, written as $[H^+]$ and measured in moles per liter, is given by the formula $pH = \log\frac{1}{[H^+]}$. What is the concentration of hydrogen ions in a liter of vinegar that has a pH level of 2.5? ***C***

16. Mateo invested $12,000 into an account that earns 4.5% compounded quarterly. If he leaves the account untouched, during which year (since initially investing) will the account double in value? ***C***