Review for Midterm Name_____ Date _____ Period _____

1. Evaluate the expression without using a calculator (you must show your work).

A.	B.	C.	D.	E.	F.	G.
$\log_2 \frac{1}{8}$	$\log 10$	$\log_b b^{-3}$	$\log_9 243$	$\log_5 -25$	$\log_7 \sqrt[3]{49}$	$\log_4 2 + \log_4 32$

2. Rewrite the equation in exponential form without a calculator.

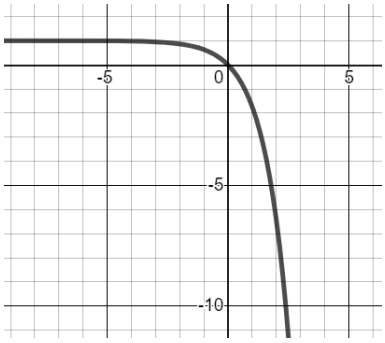
A.	B.	C.	D.
$\log_3 81 = 4$	$\log_5 0.04 = -2$	$\log_{1/2} 8 = -3$	$\log_9 3 = \frac{1}{2}$

3. Choose from the functions below to match the graphs without a calculator.

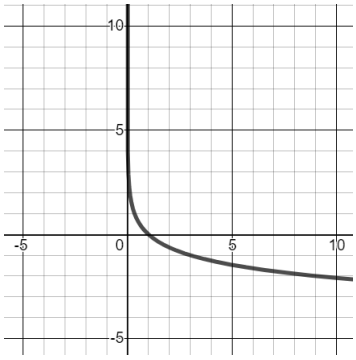
A.	B.	C.	D.	E.	F.

$y = -\log_3 x$ $y = \log_3(-x)$ $y = \log_3(x+3)$ $y = 2^{-x}$ $y = -e^x + 1$ $y = 3^x - 2$

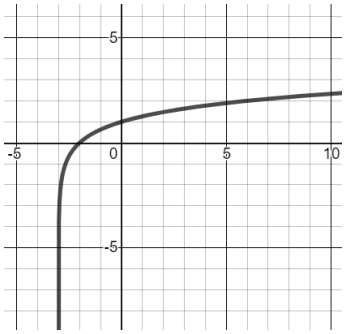
A)



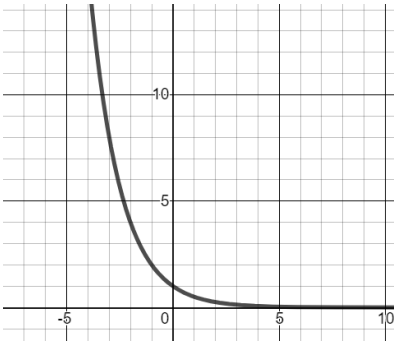
B)

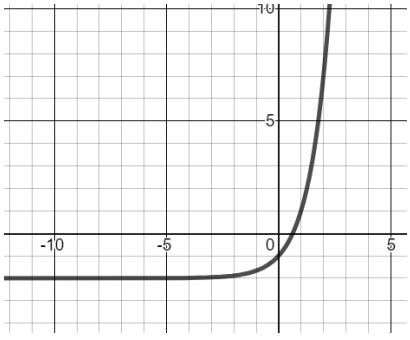


C)

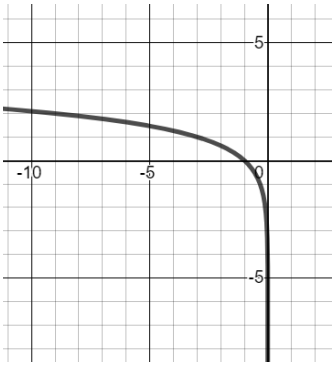


D)





F)



4. Use a calculator to evaluate the logarithm. Round to three decimal places.

a) log 145 b) 2ln 0.75 c) $\log_3 17$ d) $\log_5 \frac{1}{4}$

5. Complete the table for a savings account in which interest is compounded continuously. Round to two decimal places.

Initial investment	Annual % Rate	Time to Double	Amount after 10 years
$30,000	8.5%		
$15,000		16years	

6. Expand completely:

A.	B.	C.
$\log_2 \frac{8x^2(y-2)}{\sqrt{z}}$	$\log 4x^5$	$\ln \sqrt{x}y^3$

7. Condense completely:

A.	B.	C.
$4[\ln z + \ln(z+5)] - 2\ln(z-5)$	$\log_5 8 - \log_5 x$	$3\ln x + 4\ln y - 4\ln z$

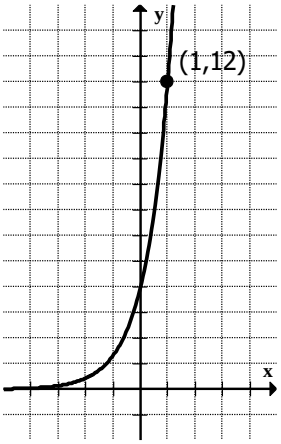
8. Solve for x in each equation

A.	B.	C.
$2^{x+2} = 32$	$2^x = 20$	$2\left(4^{2x-8}\right) - 5 = 27$
D. $\ln(11-6x) = \ln(1-x)$	E. $\log_4 x = -2$	F. $15\ln x = 45$
H. $2\log_3 5x = 20$	I. $\log_2 x + \log_2(x+2) = \log_2(x+6)$	J. $\log_3 x + \log_3(x-8) = 2$
K. $\log(3x+2) + \log(x-1) = 1$	L. $5^{4x}5^{-x} = 5^{17}$	M. $-2e^{7.4x-5} + 6 = -68.9$

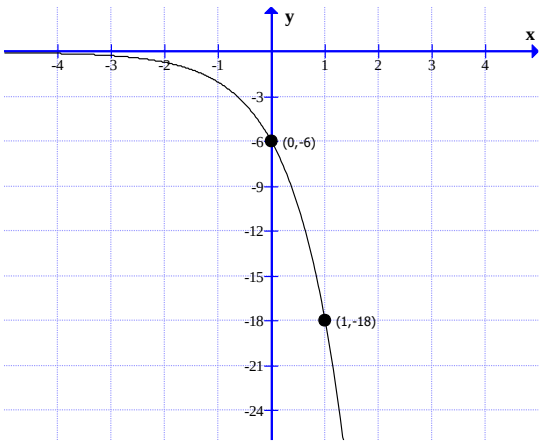
9. Calculate the amount if $10,000 is invested at 3.75% interest for 40 years. Compare the results and determine which is a better deal. a) compounded monthly b) compounded continuously	10. The number of bacteria N in a culture is modeled by $N = 200e^{kt}$ where t is the time in hours. If N = 800 when t = 4, estimate the time required for the population to double in size. Solve the equation. (first solve for k). Round to three decimal places if needed.
11. A sum of $12,000 is invested at a rate of 7.55% compounded continuously. How long will it take to double?	12. The population of Tucson is 515,526, which can be model with $P= 515{,}526e^{0.012t}$ where t= 0 represents the year 2009. According to this model, in what year will the population reach 570,000?

13. Find the exponential equation for each graph in the form $f(x) = c(b^x)$

A.

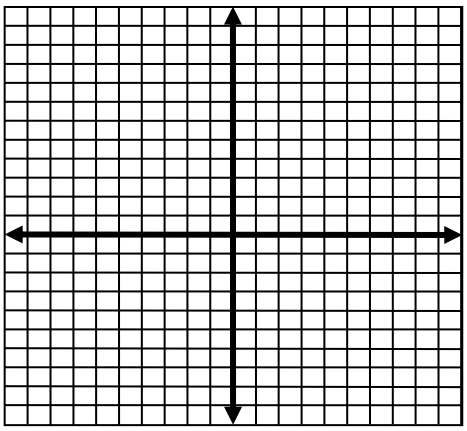


B.

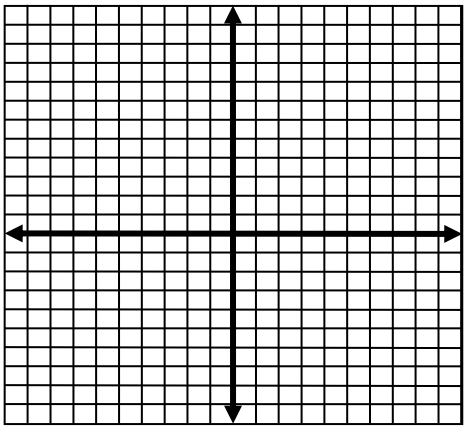


14. Sketch the graph of each function. State the shifts, domain, range, intercepts and asymptotes of each.

A. $g(x) = \log_4(x+2)+4$



B. $f(x) = -2^{x-1} - 3$



C. $h(x) = \log_2(x - 3) + 1$