Chapter 3 Study Guide

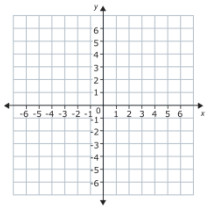
Name: _____ Date: _____

****** THIS IS NOT HOMEWORK*******

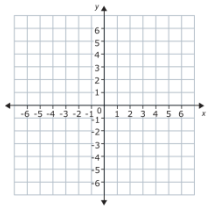
3.1	3.2	3.3	3.4	3.5
Definition of Exponentials Evaluating Exponentials Graphing Exponentials The Natural Base e	Definition of Logarithms Evaluating Logarithms with base a Graphing Logarithms with base a Evaluating Natural Logarithms	Change of Base Formula Product Property Quotient Property Power Property Expanding & Condensing	One-to-One vs. Inverse Properties Solving Exponential Equations Solving Logarithmic Equations Applications	Recognize the five most common types of models involving exponentials or logarithmic functions Use each model to solve real-life problems

Lesson 3.1— Graph the exponential function by hand. Identify asymptotes and intercepts and determine whether the graph is increasing or decreasing.

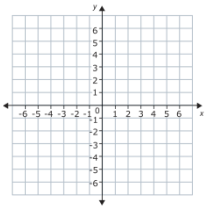
1. $f(x) = 6^x$



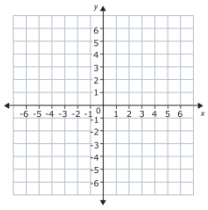
2. $f(x) = 6^{-x}$



3. $f(x) = 0.3^x$

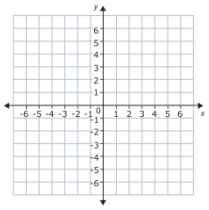


4. $f(x) = 0.3^{-x}$

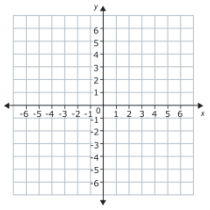


Lesson 3.1— Graph the natural base e exponential function. Identify asymptotes

5. $f(x) = e^{x-1}$



6. $f(x) = 2 + e^{-x}$



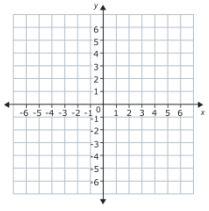
Lesson 3.1— Complete the table to determine the balance A for $10,000 invested at a rate of 8% for t years, compounded continuously.

7.

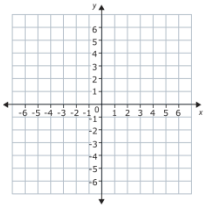
t	1	20	50
A			

Lesson 3.2— Sketch the graph of the logarithmic Function. Find the domain, VA, and x-intercept.

8. $f(x) = -log_2 x + 5$



9. $f(x) = log_5(x - 3)$



Lesson 3.3— Evaluate using the change-of-base formula. Do this for common and natural logs.

10. $log_4 9$

11. $log_{\frac{1}{2}} 8$

Lesson 3.3— Expand the following.

12. $\ln \frac{xy^5}{\sqrt{z}}$

13. $log_{10} \frac{5\sqrt{y}}{x^2}$

14. $log_4 16xy^3$

15. $\ln \frac{x}{4}$

Lesson 3.3— Condense the following.

16. $log_2 9 + log_2 x$

17. $\frac{1}{2}\ln(2x - 1) - 2\ln(x + 1)$

18. $\ln 3 + \frac{1}{3}\ln(4 - x^2) - \ln x$

19. $3[lnx - 2\ln(x^2 + 1)] + 2\ln 5$

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Lesson 3.4— Solve the following equations.

20. $2^{x+1} = \frac{1}{16}$

21. $log_8 x = 4$

22. $\ln(x-1) = 3$

23. $3e^{-5x} = 132$

24. $e^{2x} - 7e^x + 10 = 0$

25. $log_4(x-1) = log_4(x-2) - log_4(x+2)$

26. $\ln x - \ln 3 = 0$

27. $2e^{x-3} - 1 = 4$

28. $log_{10}(-x-4) = 2$

29. $\ln\sqrt{x+40} = 3$

Lesson 3.5—Solve the following word problems.

30. The populations P in thousands) of North Caroline from 1990 through 2008 can be modeled by $P = 6707.7e^{kt}$, where t is the year, with t=0 corresponding to 1990. In 2008, the population was about 9,222,000.

    a. Find the value of k, and then

    b. Use the result to predict the population in the year 2020.

31. The scores for a biology test follow a normal distribution modeled by $y = 0.0499e^{-(x-74)^2/128}$, where x is the test score and $40 \leq x \leq 100$.

    a. Use a graphing utility to graph the function (*use the given domain and use .05 as YMAX and -.001 as YMIN*)

    b. Use the graph to estimate the average test score.

32. The average number N of words per minute that the students in first grade class could read orally after t weeks of school is modeled by $N = \frac{62}{1+5.4e^{-.24t}}$. Find the numbers of weeks it took the class to read at average rates of

    a. 40 words per minute

    b. 60 words per minute

33. On the Richter scale, the magnitude R of an earthquake of intensity I is modeled by $R = log_{10}\frac{I}{I_0}$ where $I_0 = 1$ is the minimum intensity used for comparison. Find the intensities I of the following earth quakes measuring R on the Richter scale.

    a. $R = 7.1$

    b. $R = 5.5$