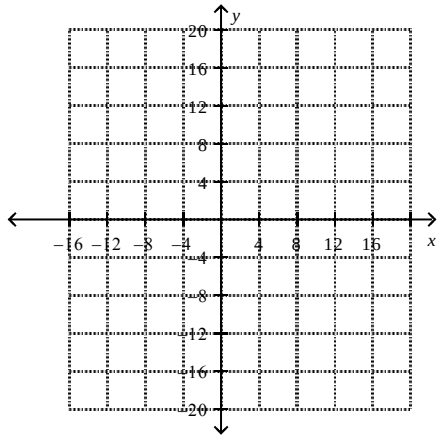
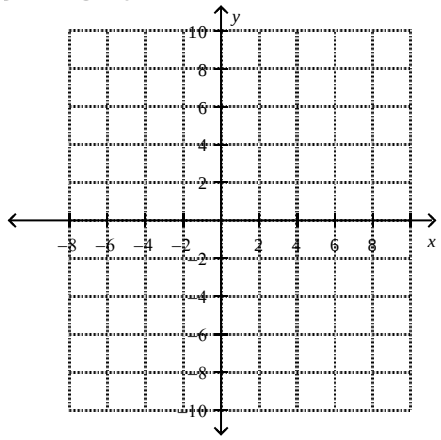
Algebra II Chapter 8 Review

In 1 & 2, Graph the exponential function.

1. $y = 6(2.6)^x$



2. $y = 2(0.5)^x$



3. Without graphing, determine whether the function $y = 4(1.7)^x$ **3.** _____ represents exponential growth or exponential decay.

4. Without graphing, determine whether the function $y = 10\left(\frac{7}{8}\right)^x$ **4.** _____ represents exponential growth or exponential decay.

5. An initial population of 910 quail increases at an annual rate of 9%. Write an exponential function to model the quail population.

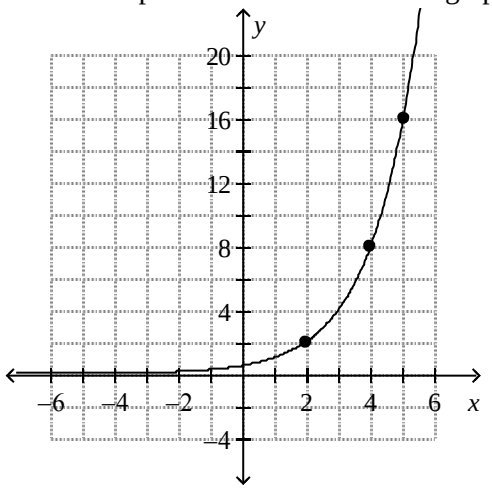
6. The population of a city is decreasing at a rate of 4% per year. There are currently about 200,000 people in the city. ***Show Work***

a. Write a function that models the population. **6a.** _____

b. How many people will there be in 20 years? **6b.** _____

7. Write an exponential function $y = ab^x$ for a graph that includes (2, 45) and (0, 5). **7.** _____

8. Write an exponential function for the graph.



9. Suppose you put $4000 into an account earning 3% interest. Find the amount at the end of 8 years if it is compounded quarterly. ***Show Work***

9. _____

10. Suppose you invest $1000 at an annual interest rate of 7.8% compounded continuously. How much will you have in the account after 10 years? ***Show Work***

10. _____

11. Suppose you invest $900 at an annual interest rate of 5.5% compounded continuously. How much will you have in the account after 30 years? ***Show Work***

11. _____

12. The half-life of a certain radioactive material is 63 hours. An initial amount of the material has a mass of 378 kg. Write an exponential function that models the decay of this material. Find how much radioactive material remains after 11 hours. Round your answer to the nearest thousandth. ***Show Work***

12. _____

13. The half-life of a certain radioactive material is 39 days. An initial amount of the material has a mass of 975 kg. Write an exponential function that models the decay of this material. Find how much radioactive material remains after 6 days. Round your answer to the nearest thousandth. ***Show Work***

13. _____

In 12 & 13, Write the equation in logarithmic form.

14. $2^{13} = 8,192$ **14.** _____

15. $125^{\frac{4}{3}} = 625$ **15.** _____

16. Write the equation $\log_{32} 8 = \frac{3}{5}$ in exponential form. **16.**_____

In 15 - 17, Evaluate the logarithm. ***Show Work***

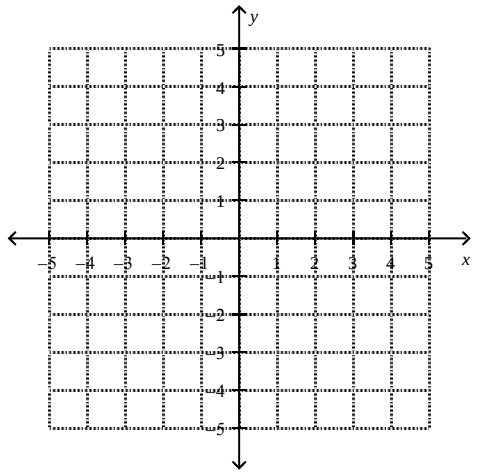
17. $\log_6 36$ **17.** _____

18. $\log_3 729$ **18.** _____

19. $\log_4 \frac{1}{16}$ **19.** _____

In 18, Graph the logarithmic equation.

20. $y = \log_2 x$



In 19 & 20, Write the expression as a single logarithm.

21. $3\log_b w + 6\log_b x$ **21.** _____

22. $\log_9 80 - \log_9 10$ **22.** _____

In 21 & 22, Expand the logarithmic expression.

23. $\log_9 \frac{m}{6}$ **23.** _____

24. $\log_8 6c^5$ **24.** _____

25. Solve $9^{6x} = 87$. Round to the nearest ten-thousandth. **25.** _____
Show Work

26. Solve $16^{5x} = 51$. Round to the nearest ten-thousandth. **26.** _____
Show Work

27. Solve $125^{9x-2} = 150$. **27.** _____
Show Work

28. Use the Change of Base Formula to evaluate $\log_4 21$. **28.** _____

29. Solve $\log(9x + 2) = 3$. ***Show Work*** **29.**_____

30. Solve $\log(5x + 8) = 2$. ***Show Work*** **30.**_____

31. Solve $3 \log 2x = 4$. Round to the nearest ten-thousandth. **31.** _____
Show Work

32. Solve $\log 5x + \log 7 = 1$. Round to the nearest hundredth if necessary. **32.** _____
Show Work

In 29 & 30, Write the expression as a single natural logarithm.

33. $2 \ln 5 + 4 \ln b$ **33.** _____

34. $3 \ln y - 6 \ln b$ **34.** _____

35. Solve In x = 0.2 **35.** _____

Show Work

36. Solve $\ln(3x-7) = 7$. Round to the nearest thousandth. **36. _____**
Show Work

37. Solve $\ln(4x+4) = 5$. Round to the nearest thousandth. **37. _____**
Show Work

In 33, Use natural logarithms to solve the equation. Round to the nearest thousandth.

38. $e^{2x} = 1.4$ ***Show Work*** **38. _____**

39. The amount of money in an account with continuously compounded interest is given by the formula $A = Pe^{rt}$, where *P* is the principal, *r* is the annual interest rate, and *t* is the time in years. Calculate to the nearest hundredth of a year how long it takes for an amount of money to double if interest is compounded continuously at 2.7%. Round to the nearest tenth.
Show Work

39. _____

40. A company with loud machinery needs to cut its sound intensity to 53% of its original level. By how many decibels would the loudness be reduced? Use the formula $L = 10\log\frac{I}{I_o}$. Round to the nearest hundredth.

Show Work

40. _____