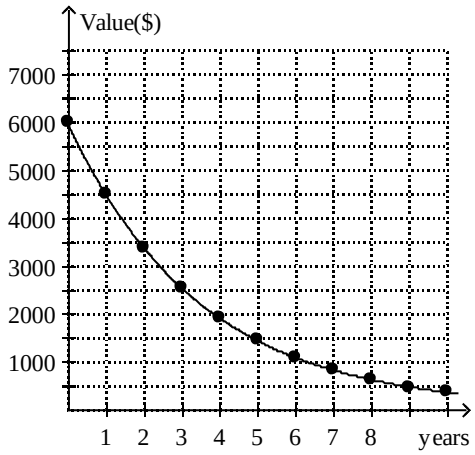
Algebra II Chapter 8 Review

Calculator-allowed Section

1. An initial population of 685 Aggies increases at an annual rate of 14%. Write an exponential function to model the Aggie population. *(see Pg. 439, example 2)*
2. An initial population of 213 lysine-deprived dinosaurs decreases at an annual rate of 35%. Write an exponential function to model the dino population.
3. Find the annual percent increase or decrease that each function models:
   a. $y = 42(1.62)^x$ b. $y = 0.315(0.78)^x$ c. $y = 215(2.7)^x$
4. Write an exponential function $y = ab^x$ for a graph that includes (1, 14) and (2, 28). *(see Pg. 440, example 3)*
5. Write an exponential function $y = ab^x$ for a graph that includes (1, 12) and (0, 3).
6. The exponential decay graph shows the expected depreciation for a diamond-studded prom dress, selling for $6000, over 10 years.



Write an exponential function for the graph. *(Hint: write the coordinates of any two points from the graph, then do this problem the same way as #4 and #5)*

7. The half-life of a certain radioactive material is 65 hours. An initial amount of the material has a mass of 8 kg. Write an exponential function that models the decay of this material. Find how much radioactive material remains after 8 hours. Round your answer to the nearest thousandth. *(see Pg. 448, example 3)*
8. Suppose you invest $1600 at an annual interest rate of 4.6% compounded continuously. How much will you have in the account after 4 years? *(hint: the formula for this is $A = Pe^{rt}$ - make sure that you know this for the test!!!)*

The pH of a liquid is a measure of how acidic or basic it is. The concentration of hydrogen ions in a liquid is labeled $[H^+]$. Use the formula $pH = -\log[H^+]$ to answer questions about pH.

9. Find the pH level, to the nearest tenth, of a liquid with $[H^+]$ about 6.5×10^{-3}.
10. The pH of a juice drink is 3.4. Find the concentration of hydrogen ions in the drink. *(see Pg. 456, example 4)*
11. Graph $y = 3(4)^{x-2} - 3$. **Show a table of values for *x* from -5 to 5.**
12. Graph $y = \log(x + 1) + 5$. **Show a table of values for *x* from 0 to 5.**
13. Graph $y = \log(x - 5) + 3$. **Show a table of values for *x* from 6 to 11.**

Solve each equation. Round to the nearest ten-thousandth ***(i.e., 4 decimal places)***

14. $11^{5x} = 40$ 15. $2^{6x} = 36$ 16. $3 \log 2x = 4$ 17. $\ln(2x - 1) = 8$

18. Use the Change of Base Formula to evaluate $\log_5 58$. Then convert $\log_5 58$ to a logarithm in base 2. Round to the nearest thousandth. *(see Pg. 471, example 5)*

19. Use the Change of Base Formula to evaluate $\log_4 85$. Then convert $\log_4 85$ to a logarithm in base 5. Round to the nearest thousandth. *(see Pg. 471, example 5)*

20. The sales of backpacks *t* months after a particular model is introduced is given by the function $y = 320 \ln(7t + 5)$, where *y* is the number of backpacks sold. How many backpacks will be sold 4.5 months after a model is introduced? Round the answer to the nearest whole number. *(hint: just plug the number into the equation and use your calculator!!!)*

Use natural logarithms to solve the equation. Round to the nearest thousandth. *(see Pg. 480, example 4)*

21. $6e^{4x} - 2 = 3$ 22. $4e^{3x} + 1 = 16$

Non-Calculator Section

23. Graph $y = 3^x$. **Show a table of values with *x* from -3 to 3.**

Write the equation in logarithmic form. *(see Pg. 455, example 2)*

24. $2^{10} = 1,024$ 25. $125^{\frac{4}{3}} = 625$

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

Write the expression as a single logarithm. *(see Pg. 463, example 2)*

27. $5 \log_b q + 2 \log_b y$ 28. $2 \log_b t + 4 \log_b v$ 29. $3 \log x - 4 \log (x - 5)$

Expand the logarithmic expression. *(see Pg. 463, example 3)*

30. $\log_5 \frac{b}{7}$ 31. $\log_7 6b^3$

Write the expression as a single natural logarithm. *(see Pg. 478, example 1)*

32. $3 \ln 3 + 3 \ln c$ 33. $3 \ln x - 2 \ln c$

34. Simplify $\log_5 5^9$. 35. Simplify $\ln e^{24}$. 36. Simplify $\ln e^{79}$.

37. Solve $\ln x - \ln 4 = 0$. *(Yes, you can do this **<u>without</u>** using a calculator!)*

Evaluate the logarithm.

38. $\log_2 32$ 39. $\log_7 49$