**Homework 7-1 SOLVE ALL HOMEWORK PROBLEMS ON A SEPARATE SHEET OF PAPER (GRAPH PAPER AS NEEDED)**

**1. graph  2.**  D**etermine whether the function represents exponential growth or exponential decay.**

 **a)** y = 2 (1/2)x  **b)**

**3. Write an exponential function to model each situation. Find each amount after the specified time.**

**a)** population of 1,236,000 grows 1.3% per year for 10 years **b)** A new car that sells for $18,000 depreciates 25% each year for 4 years.

**4. For each annual rate of change, find the corresponding growth or decay factor.**

**a)** + 45% **b)** − 10% **c)** − 40% **d)** + 200%

**HOMEWORK 7-2**

**1.** How long would it take to double your principal at an annual interest rate of 7% compounded continuously?

**2. Error Analysis** A student says that the graph of *f*(*x*) = 2*x* + 3 + 4 is a shift of 3 units up and 4 units to the right of the parent function. Describe and correct the student’s error.

**3.** The isotope Hg-197 is used in kidney scans. It has a half-life of 64.128 h. After that time, half the isotope will have decayed. Write the exponential decay function for a 12-mg sample. Find the amount remaining after 72 h.

**4.** The isotope Sr-85 is used in bone scans. It has a half-life of 64.9 days. Write the exponential decay function for an 8-mg sample. Find the amount remaining after 100 days.

**5.** Suppose you invest $2000 at an annual interest of 5.5% compounded continuously.

**a.** How much will you have in the account in 10 years?

**b.** How long will it take for the account to reach $5000?

**HOMEWORK 7-3**

**Write each equation in logarithmic form.**

**1.** **2. ** **3. ** **4. **

**5.** 29 = 512 **6.** 45 = 1024 **7.** 54 = 625 **8.** 10-3 = 0.001

**Evaluate each logarithm.**

**9.****** **10. ** **11. ** **12.** ****

**13.** **14.** log 100,000 **15. ** **16. **

**Describe how the graph of each function compares with the graph of the parent function, .**

**17.  18.** ** **19.** ** 20. **

**Write each equation in exponential form.**

**21. ** **22.****** **23. **

**24.** log 10 = 1 **25.** **26.** ****

**27.** A single-celled bacterium divides every hour. The number *N* of bacteria after *t* hours is given by the formula log2 *N* = *t*. After how many hours will there be 32 bacteria?

**HOMEWORK 7-4**

**Write each expression as a single logarithm.**

**1.  2.** **3. **

**4. 5. ** **6.** log 7 − log 3 + log 6

**7.** 2 log *x* − 3 log *y* **8. ** **9.** log3 4*x +* 2 log3 5*y*

**10.** 5 log 2 − 2 log 2 **11.** **12.** 2 log 4 + log 2 + log 2

**13.** (log 3 − log 4) − log 2 **14.** 5 log *x* + 3 log *x*2 **15. **

**16.** log 2 + log 4 − log 7 **17.  18. **

**19.  20.** 3(4 log *t*2) **21. **

**Expand each logarithm. Simplify if possible.**

**22.** log *xyz* **23.**  **24. **  **25.** log 7(3*x* − 2)2 **26. **

**27. ** **28.** ** 29.  30.** ****

**Determine if each statement is *true* or *false*. Justify your answer.
31.** log 12 = log 4 + log 3 **32. ** **33. 34. **

**Use the properties of logarithms to evaluate each expression.**

**35.** **36. ** **37. **

**38. ** **39. ** **40. **

**HOMEWORK 7-5/ 7-6**

**Solve each equation.** Round to the nearest hundredth if needed. **1. ** **2. ** **3. ** **4. ** **5. ** **6. **

**7. ** **8.** **** **9. ** **10. ** **11. ** **12.** 4*x −* 5 = 12

**13.** 2 log *x* = 2 **14.** log (2*x* + 5) = 3 **15.** log (3*x* − 2) 5=3 **16.** log (*x* − 25) = 2 **17.** 2 log (2*x* + 5) = 4 **18.** 3 log (1 − 2*x*) = 6

**19.** Suppose the population of a country is currently 8,100,000. Studies show this country’s population is increasing 2% each year.

**a.** What exponential function would be a good model for this country’s population?

**b.** Using the equation you found in part (a), how many years will it take for the country’s population to reach 9 million? Round your answer to the nearest hundredth.

**20.** 3*e*3*x*−5 = 49 **21.** 7*e*5*x+*8 = 0.23 **22.** 6 − *e*12*x =* 5.2 **23.** −7 + ln 2*x =* 4 **24.** 3 − 4 ln (8*x +* 1) = 12 **25.** ln *x +* ln 3*x =* 14 **26.** 2ln *x +* ln *x*2 = 3 **27.** ln *x +* ln 4 = 2 **28.** ln *x −* ln 5 = −1 **29.** ln *ex*+5 = 17

**By measuring the amount of carbon-14 in an object, a paleontologist can determine its approximate age. The amount of carbon-14 in an object is given by *y = ae*−0.00012*t*, where *a* is the amount of carbon-14 originally in the object, and *t* is the age of the object in years.**

**30.** A fossil of a bone contains 32% of its original carbon-14. What is the approximate age of the bone?