## Precalculus Review Chapter 4 page 1 _____

**Find each of the following without using a calculator.**

1. $\log_4 256 =$ _____
2. $\log_4 0.25 =$ _____
3. $\log_{27} 9 =$ _____

**Solve each of the following equations, without using a calculator.**

4. $5^{(3x+2)} = 125$
5. $\log_2 x + \log_2 (x - 6) = 4$
6. $8^{(x+3)} = 32^{(2x-1)}$
7. $\log_3 (10x - 17) - \log_3 (x - 2) = \log_3 (x + 6)$

**Let $w = \log_B 2$, $x = \log_B 3$, and $y = \log_B 5$. Express each of the following in terms of w, x, and/or y.**

8. $\log_B 10 =$ _____
9. $\log_B 125 =$ _____
10. $\log_B 0.6 =$ _____
11. $\log_B (5B^2) =$ _____

# Precalculus Review Chapter 4 page 2

**Find each of the following. Round your answers to two decimal places.**

**12.** $\log_3 30 =$ _____

**13.** $\log_3 e^6 =$ _____

**Express each of the following as the log of a single expression.**

**14.** $3\log x + 2\log y - 5\log z =$ _____

**15.** $0.5(\log x - \log 2) =$ _____

**Solve each of the following problems. (Show any equation you use to find your solution.)**

**16. $8000 is invested at 4.5% per year compounded daily. What will the balance be after 20 years?**

_____

**17. $10,000 is invested at 7% per year compounded continuously. What will be the balance after 20 years?**

_____

**Solve each of the following equations. Express your solutions rounded to two decimal places.**

**18.** $e^{(2x+1)} = 20$

**19.** $\log x + \log(3x - 1) = 1$

# Precalculus Review Chapter 4 page 3

**Solve each of the following problems. Show all of your work neatly organized. (Round off to 3 significant digits, where appropriate.)**

**20. A certain city had a population of 400,000 in 1970 and 550,000 in 1990.**
**a. Express the population as a function of time using the model $P = Ce^{kt}$. Assume t = 0 corresponds to the year 1970.**

_____

**b. Use your model to estimate the population of the city in the year 2000.**

**21. A certain radioactive substance, having a current mass of 25.0 grams, has a half-life of 200 years.**
**a. Express the quantity of the substance as a function of time using the model $Q = Me^{kt}$.**

_____

**b. Use your model to approximate the mass remaining in 500 years.**

**Solve each of the following problems. Show all of your work neatly organized. (Round off to 3 significant digits, where appropriate.)**

**22. A computer that costs $2000 new has a depreciated value of $1200 after 4 years.**
**a. Express the depreciated value of the computer as a function of time using the model $V = Ce^{kt}$.**

_____

**b. Use your model to approximate the depreciated value of the computer after 7 years.**

**23. A particular strain of bacteria grows in a culture from a population of 250 bacteria to 600 bacteria in 3 hours.**
**a. Express the number of bacteria present in the culture as a function of time using the model $N = Ce^{kt}$.**

**b. Use your model to estimate the number of bacteria present after 4 hours.**