MAT 111 -- section _____ Worksheet Name: _____
Sections 6.5 – 6.8

Seat: _____

6.5 Properties of Logarithms – Summary on page 459 (see also page 426).
Based on the fact that "logarithms are exponents" and thus follow the properties of exponents.

Evaluate without a calculator:

1. $\log_2\left(\frac{1}{8}\right) =$ _____

2. $\ln e^{3x} =$ _____

3. $4e^{\ln 2x} =$ _____

4. $3^{\log_3 2x} =$ _____

Rewrite as a single logarithm and simplify.

5. $3\log_2 u - 5\log_2 v^3$

6. $2\log 2 + 3\log x - \frac{1}{2}[\log(x+3) + \log(x-2)]$

_____ _____

Write as the sum or difference of logs, writing powers as factors.

7. $\ln\left(\frac{x-4}{(x+4)^3}\right)$

8. $\log\left(\frac{x\sqrt[3]{x^2+1}}{x-3}\right)$

_____ _____

Evaluate with the Change-of-Base Formula:

9. $\log_2 11 =$ _____

10. $\log_7 25 =$ _____

6.6 Logarithmic and Exponential Equations – See pages 462 – 466.

11. $3^{2x+1} + 4 = 40$

x =_____

12. $e^{1-x} = 5$

x = _____

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13. $5^{x+2} = 7^{x-2}$

x =_____

14. $2^{x+1} \cdot 8^{-x} = 4$

x = _____

15. $\log_5(x^2 - 4x) = 1$

x =_____

16. $\log(x^2 + 3) = \log(x + 6)$

x = _____

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17. $\log_2(x - 4) + \log_2(x + 4) = 3$

x =_____

6.7 Compound Interest – See pages 470 - 475

18. Find the amount that results when $200 is invested at 8% compounded quarterly for a period of two years.

19. Calculate the amount of money that should be invested at 6% compounded continuously to produce a final balance of $20,000 in five years.

6.8 Exponential Growth and Decay – See pages 479- 484

20. The population of a small city follows the exponential law. If the population doubled in size over a 5 year period and the current population is 40,000, what will the population be 3 years from now?

21. The population P of a city is given by $P = 120{,}000e^{kt}$ where t = 0 in 1990. In 1995 the population was 140,000. a.) Find the value of k, and b.) use this value to predict the population in the year 2001. c.) When will the population be 200,000?