MATH 125 College Algebra OpenStax Name:_____Section_____

Section 6.3 Logarithmic Functions Professor _____

- A logarithmic function is the inverse of an exponential function
  - $f(x) = b^x$ or $y = b^x$ is equivalent to
- Thus $x = b^y$ is the same as $y = \log_b x$

Convert forms:

1. $\log_6 36 = 2$
2. $\log_b n = 23$
3. $5^{-3} = \frac{1}{125}$

Evaluate:

4. $\log_3 81$
5. $\log_3 3$
6. $\log_9 27$

7. $\log_5 \frac{1}{25}$
8. $\log_7 1$
9. $\log_6 6^5$

Solve

10. $\log_4 x = 3$
11. $\log_3 x = -5$
12. $\log_x 9 = \frac{1}{2}$

13. $\log_5 25 = x$

14. $\log_2 64 = x$

15. $\log_x 6 = \frac{1}{3}$

Product Rule: $\log_b (MN) = \log_b M + \log_b N$

Quotient Rule: $\log_b \left(\frac{M}{N}\right) = \log_b M - \log_b N$

Power Rule: $\log_b \left(M^p\right) = p \log_b M$

Change of Base Formula $\log_b M = \frac{\log_a M}{\log_a b}$

16. $\log_5 \left(\frac{\sqrt{x}}{25}\right)$

17. $\log\left(\frac{x^3\sqrt{x^2+1}}{(x+1)^4(x-1)}\right)$

18. $\frac{1}{3}\log(x+9) + 4\log x$

19. $\log x + \log\left(x^2-1\right) - \log 7 - \log(x+2)$