MATH 34A: EXPONENTS AND LOGARITHMS

♣**What is logarithm? What does the expression $log_b x$ mean?**

Using this definition, find the following without using a calculator.

1. $log_3 27$

2. $log_{10} 1000000$

3. $log_6 \sqrt{6}$

4. $log_2(\frac{1}{8})$

5. $log_{\frac{1}{5}}(25)$

*6. $log_2(log_3 9)$

*7. When is the log function undefined? That is, when does the expression $log x$ not make sense?

♣**Rules on exponents and logarithms.**

1. Multiplication ↔ Addition

2. Division ↔ Subtraction

3. "The Power Rule"

!!These rules work only if all the log-expressions are in the same base!!

Using these rules, simplify the following.

!1. $log(81)$

!2. $log(20) + log(5) - log(100)$

3. $log(2 \cdot 3^{40})$

4. $log(9 \cdot 100)$

♣Using logarithm to solve exponential equations.

When the unknown x is in the exponent, we can take logs on both sides of the equation to bring it down using "the power rule".

Practice. Solve for x. Simplify your answer as much as you can using the rules above.

!1. $6^{3x} = 20$

2. $4^{x+1} = 7^{3x-4}$

3. $9^{-4x+8} = 20$

*4. $17^{2^x} = 3^{14^{2x}}$

*5. $2^{x^2+x} = 8^{-3x+4}$