CW#___ Name:_____________________

7.1.2 How can I rewrite it?

Investigating the Properties of Logarithms

#17 Since the log function is the inverse of an exponential function, the properties of exponents also apply to logarithms. The problems below will help you discover how exponent properties apply to logarithms.

a. Complete the two exponent rules below.

$x^m x^n =$ __________	$\frac{x^m}{x^n} =$ __________

b. To help you write the equivalent log properties, use your calculator to solve for *x* in each problem below. Note that *x* is a whole number in parts (*i*) through (*v*). Look for patterns that will make your job easier and allow you to generalize in part (*vi*).

i. log(5) + log(6) = log(*x*)	*ii.* log(5) + log(2) = log(*x*)
iii. *log(5) + log(5) = log(x)*	*iv.* log(10) + log(100) = log(*x*)
v. *log(9) + log(11) = log(x)*	*vi.* log(*m*) + log(*n*) = log(____)

c. What if the log expressions are being subtracted instead of added? Solve for x in each problem below. Note that x will not always be a whole number. Again, look for patterns that will allow you to generalize in part (vi).	
i. *log(20) – log(5) = log(x)*	*ii.* log(30) – log(3) = log(x)
iii. *log(5) – log(2) = log(x)*	*iv.* log(17) – log(9) = log(x)
v. *log(375) – log(17) = log(x)*	*vi.* log(m) – log(n) = log(____)

Now use the patterns you noticed to rewrite each expression as a single logarithm.	
a. $\log_2(2) + \log_2(3)$	b. $\log_2(3) + \log_2(5)$
c. $\log_2(12) - \log_2(6)$	d. $\log_2(15) - \log_2(3)$