From yesterday....

Ex 4) $\log_6 x + 3 \, (1)$

$\log_6 x + 3 \, (\log_6 6)$

$\log_6 x + 3 \log_6 6$

$\log_6 x + \log_6 6^3$

$\log_6 (6^3 x)$

$\log_m m = 1$

Use Log Laws to Evaluate Expressions

ex 1) $\log_6 8 + \log_6 9 - \log_6 2$

$\log_6 \left(\dfrac{\overset{4}{8} \cdot 9}{\cancel{2}} \right)$

$\log_6 (36)$

2

scrap

$\log_6 36 = X$

$6^X = 36$

$X = 2$

ex 2) $\log_7 7 + \log_7 \sqrt{7}$

$\log_7 7 + \dfrac{1}{2} \log_7 7$

$1 + \dfrac{1}{2}(1)$

$1\frac{1}{2}$ or $\dfrac{3}{2}$

$\sqrt{7} = 7^{1/2}$

$\log_7 7 + \log_7 7^{1/2}$

$\log_7 (7^1 \cdot 7^{1/2})$

$\log_7 (7^{3/2})$

$\dfrac{3}{2} \log_7 7$

$\dfrac{3}{2}$

ex 3) $2\log_2 12 - (\log_2 6 + \dfrac{1}{3} \log_2 27)$

$\log_2 12^2 - (\log_2 6 + \log_2 27^{1/3})$

$\log_2 \left(\dfrac{\overset{2}{\cancel{12}} \cdot \overset{4}{\cancel{12}}}{\cancel{6} \cdot 3\cancel{\sqrt{27}}} \right)$

$\log_2 (8)$

3

scrap

$2^X = 8$

$X = 3$

ex 4) Given $\log_m(2) = x$

$\log_m(9) = y$

Express each in terms of x and y:

a) $\log_m(4.5)$

$\log_m\left(\dfrac{9}{2}\right)$

$\underline{\log m(9)} - \underline{\log m(2)} = y - x$

b) $\log_m(18) = \log m(9 \cdot 2)$

$\log m(9) + \log m(2)$

$y + x$

c) $\log_m(6) = \log m(\sqrt{9} \cdot 2) = \log m(9^{\frac{1}{2}} \cdot 2)$

$\frac{1}{2}\log m(9) + \log m(2)$

$\frac{1}{2}y + x$ or $\dfrac{y}{2} + x$

d) $\log_m(72) = \log m(2^3 \cdot 9)$

$3\log m(2) + \log m(9)$

$3x + y$

ex 5) <u>Estimate</u> the value of $\log_2(10)$. <u>Justify</u> your answer.

Let $\log_2(10) = x$

$2^3 = 8$ $2^x = 10$ $2^4 = 16$

$\log_2(10) \approx 3.2$

$\log_2(8) = 3$ or $\log_2(16) = 4$

$\log_2(10) \approx 3.2$

$|2| = 2$

Grade 9 review

$\sqrt{16}$ $\sqrt{17}$ $\sqrt{25}$

4 $\underline{4.1}$ 5

p. 393 #4, 8d, 12, 13, 14, 18

p. 405 #3

#20 $\log_{8/27} 9/4 = x$

$$\left(\frac{8}{27}\right)^x = \frac{9}{4}$$

$$\left(\frac{27}{8}\right)^{-x} = \frac{9}{4}$$

$$\left(\frac{3^3}{2^3}\right)^{-x} = \frac{3^2}{2^2}$$

$$\left(\frac{3}{2}\right)^{-3x} = \left(\frac{3}{2}\right)^2$$

#7 $\log_x 1 = -4$

$$x^{-4} = 1$$

$$\sqrt[4]{\frac{1}{x^4}} = \sqrt[4]{1}$$

$$\frac{1}{x} = 1$$

$$\boxed{x = \pm 1}$$

#11 $\log_9 \frac{1}{3} = x$

$$9^x = \frac{1}{3}$$

$$3^{2x} = \frac{1}{3}$$

$$3^{2x} = 3^{-1}$$

#17 $\log_{1/8} \frac{1}{2} = x$

$$\left(\frac{1}{8}\right)^x = \frac{1}{2}$$

$$\left(\frac{1^3}{2^3}\right)^x = \frac{1}{2}$$

$$\left(\frac{1}{2}\right)^{3x} = \left(\frac{1}{2}\right)^1$$

#6

$$\frac{2}{2}\left(5^{2x-9}\right) = \frac{250}{2}$$

$$5^{2x-9} = 125$$

$$5^{2x-9} = 5^3$$

$$2x - 9 = 3$$

$$x = 6$$

Quiz Outline   <u>Quiz</u> Monday, Feb 10th

1) Blue WS
   Exponential Equations

2) Pink WS
   Logarithmic Equations → turn to exp. eqns
                                    + solve

3) Logarithm Laws
        → Expand
        → Unexpand   (No evaluating)