

Worksheet from last class

$$1. \log_3 x^2 + \log_3 5 - \log_3 x = \log_3 15$$

$$\log_3 \frac{5x^2}{x} = \log_3 15$$

$$\frac{5x^2}{x} = 15$$

$$5x = 15$$

$$x = 3$$

$$2. \log_5 (x^2 - 4) + \log_5 2 - \log_5 (x - 2) = \log_5 8$$

$$\log_5 \frac{2(x^2 - 4)}{(x - 2)} = \log_5 8$$

$$\frac{2(x^2 - 4)}{(x - 2)} = 8$$

$$\frac{x^2 - 4}{x - 2} = 4$$

$$\frac{(x+2)(x-2)}{(x-2)} = 4$$

$$x + 2 = 4$$

$$x = 2$$

$$3. \log_7 x + \log_7 3 - \log_7 5 = \log_7 2$$

$$\log_7 \frac{3x}{5} = \log_7 2$$

$$\frac{3x}{5} = \frac{2}{1}$$

$$3x = 10$$

$$x = \frac{10}{3}$$

$$4. \log_9 \frac{x^2}{4} + \log_9 6 - \log_9 3 = \log_9 x$$

$$\log_9 \frac{6x^2}{4(3)} = \log_9 x$$

$$\log_9 \frac{6x^2}{12} = \log_9 x$$

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

$$x^2 = 2x$$

$$x^2 - 2x = 0$$

$$x(x-2) = 0$$

$$\cancel{x=0} \quad x=2$$

Solving Log Equations where you can't cancel logs.

$$\text{ex.1} \quad \log_2 2x - \log_2 3 = 4$$

$$\log_2 \frac{2x}{3} = 4$$

no log

* change to exponential form

$$2^4 = \frac{2x}{3}$$

$$16 = \frac{2x}{3}$$

$$48 = 2x$$

$$24 = x$$

$$\text{ex.2) } \log_3 x + \log_3 (x-2) = 1$$

$$\log_3 x(x-2) = 1$$

$$\log_3 (x^2 - 2x) = 1$$

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

$$3 = x^2 - 2x$$

$$0 = x^2 - 2x - 3$$

$$0 = (x-3)(x+1)$$

$$x=3 \quad \text{or} \quad x=-1$$

reject because

$\log x \Rightarrow \log(-1)$ is not possible

Above 3201;

$$\log_5(10x+4) - \log_5 2 = \frac{1}{2} \log_5 49 + 2 \log_5 4$$

$$\log_5 \frac{10x+4}{2} = \log_5 49^{1/2} + \log_5 4^2$$

$$\log_5 5x+2 = \log_5 7 + \log_5 16$$

~~$$\log_5 5x+2 = \log_5 112$$~~

$$5x+2 = 112$$

$$5x = 110$$

$$x = \frac{110}{5} = 22$$

April 16 sheet

$$1) x = \pm \sqrt{\frac{1}{2}}$$

$$2) 3$$

$$3) -2$$

$$4) \frac{9}{4}$$

$$5) -5,3$$

$$6) \frac{5}{8}$$

$$7) \pm \sqrt{\frac{1}{3}}$$

$$8) 5$$

$$9) \frac{3}{8}$$

$$10) -2,7$$

$$11) 6$$

$$12) 20$$