Algebra 3-4

Name: _____

U3LT2: I can solve logarithmic and exponential equations.

Check your solutions. Round your answers to three decimal places when necessary.

1. $\log(x-1) - \log 2 = -1$

$$\log \frac{x-1}{2} = -1$$

$$10^{-1} = \frac{x-1}{2}$$

$$\frac{1}{10} = \frac{x-1}{2}$$

$$2 = 10x - 10$$

$$12 = 10x$$

$$\boxed{1.2 = x}$$

2. $\log_3 4x = \log_3(5x-2)$

$$4x = 5x - 2$$
$$+2 \quad -4x \qquad -4x \quad +2$$

$$\boxed{2 = x}$$

3. $\log_2(x) + \log_2(4x) + 2 = 2$

$$\log_2(4x^2) = 0$$

$$2^0 = 4x^2$$

$$\frac{1}{4} = x^2$$

$$\sqrt{\frac{1}{4}} = x$$

$$\boxed{x = \frac{1}{2}}$$

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

$$\log_5 \sqrt{x+2} - 2 = \log_5 2 \quad .4307$$

$$\log_5 \sqrt{x+2} - \log_5 2 + 2$$

$$\log_5 \sqrt{x+2} = 2.4307$$

$$5^{2.4307} = \sqrt{x+2}$$

$$50^2 = x+2$$

$$2500 = x+2$$

$$\boxed{2498 = x}$$

5. $-4 \cdot 5^{2x} = -20$

$$5^{2x} = 5$$

$$2x = 1$$

$$\boxed{x = \frac{1}{2}}$$

6. $3^{x+4} = 81$

$$3^{x+4} = 3^4$$

$$\boxed{x = 0}$$

7. $\log_4(2x - 2) = 5$

$$4^5 = 2x - 2$$

$$1026 = 2x$$

$$\boxed{x = 513}$$

8. $2^{x+1} = 3$

$$\log_2 3 = x + 1$$

$$1.5849 = x + 1$$

$$\boxed{.584 = x}$$

9. $\log(x) + \log(x - 2) = 8$ $\overset{\log(8)}{}$

$$\log(x^2 - 2x) = 8$$

$$10^8 \cancel{= |x^2| - |2x|}$$

$\boxed{x = 4}$

$\cancel{x = -2}$

$$x^2 - 2x = 8$$

$$x^2 - 2x - 8 = 0$$

$$(x - 4)(x + 2) = 0$$

10. $x = \log_4 6 - \log_4 2$

$$x = \log_4 \frac{6}{2}$$

$$x = \log_4 3$$

$$\boxed{x = .792}$$

11. $3 + \log(17 + x) = 5$

$$\log(17 + x) = 2$$

$$10^2 = 17 + x$$

$$\boxed{83 = x}$$

12. $\log_3(x - 1) + \log_3(x + 1) = 6$

$$\log_3(x^2 - 1) = 6$$

$$3^6 = x^2 - 1$$

$$730 = x^2$$

$$\boxed{x = 27.01}$$

13.) If there is no base on a logarithm, what do we assume the base is?

$$10$$

14.) Explain one property that helps you CONDENSE logs.

every prime is closed

$\dfrac{1}{1}$ $\dfrac{0}{2}$ $\dfrac{0}{3}$ $\dfrac{c}{4}$ $\dfrac{0}{5}$ $\dfrac{c}{6}$ $\dfrac{c}{7}$ $\dfrac{c}{9}$