Alg 2

Practice 6-6 B = Logarithmic Equations

Name POSTED KEY

Hr _____

Problem Set

Solve each logarithmic equation. Check your answer(s).

1. $\log_2 (x^2 - x) = 1$

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$2^1 = x^2 - x$

$0 = x^2 - x - 2$

$0 = (x + 1)(x - 2)$

$x = -1, 2$

Check:

$\log_2 ((-1)^2 - (-1)) \stackrel{?}{=} 1$

$\log_2 (1 + 1) \stackrel{?}{=} 1$

$\log_2 2 = 1$

$\log_2 (2^2 - 2) \stackrel{?}{=} 1$

$\log_2 (4 - 2) \stackrel{?}{=} 1$

$\log_2 2 = 1$

2. $\log_{15} (x^2 - 2x) = 1$

$x = 5, x = -3$

3. $\log_6 (x^2 + 5x) = 2$

$x = -9$

$x = 4$

4. $\log_2 (x^2 + 6x) = 4$

$x = -8$

$x = 2$

5. $\log_4(x^2 - 12x) = 3$

$x = 16$

$x = -4$

6. $\log_{10}(x^2 + 15x) = 2$

$x = -20$

$x = 5$

7. $\log_2(3x^2 + 18x) = 4$

$x = -9$

$x = 3$

8. $\log_4(2x^2 - 28x) = 3$

$x = 16$

$x = -2$

Use the properties of logarithms to solve each logarithmic equation. Check your answer(s).

9. $2\log_3 x - \log_3 8 = \log_3 (x-2)$

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$\log_3 x^2 - \log_3 8 = \log_3 (x-2)$

$\log_3 \left(\frac{x^2}{8}\right) = \log_3 (x-2)$

$\frac{x^2}{8} = x - 2$

$x^2 = 8x - 16$

$x^2 - 8x + 16 = 0$

$(x-4)^2 = 0$

$x = 4$

Check:

$2\log_3 4 - \log_3 8 \stackrel{?}{=} \log_3 (4-2)$

$\log_3 16 - \log_3 8 \stackrel{?}{=} \log_3 2$

$\log_3 \left(\frac{16}{8}\right) \stackrel{?}{=} \log_3 2$

$\log_3 2 = \log_3 2$

10. $\log_4 (x+3) + \log_4 x = 1$

$x = 1$

11. $\log (2x^2 + 3) + \log 2 = \log 10x$

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

$x = 1$

12. $\log_2 x + \log_2 (x-6) = 4$

$x = 8$

13. $2\log_5 x - \log_5 4 = \log_5 (8 - x)$

$x = 4$

14. $\log_2 3 + \log_2 (3x^2 + 4) = \log_2 (39x)$

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

$x = 4$