

# (H) Math 3 - Solving Logarithmic Equations.

Day 7

Please do your work on a separate sheet of paper. You must show ALL work and attempt ALL problems to receive full credit. Please check your answers BEFORE class!

Solve each equation.

9.  $\log_6 x + \log_6 9 = \log_6 54$   $x=6$

10.  $\log_8 48 - \log_8 w = \log_8 4$   $w=12$

11.  $\log_7 n = \frac{2}{3} \log_7 8$   $n=4$

12.  $\log_3 y = \frac{1}{4} \log_3 16 + \frac{1}{3} \log_3 64$

13.  $\log_9 (3u + 14) - \log_9 5 = \log_9 2u$

14.  $\log_7 x + \log_7 x - \log_7 3 = \log_7 12$

15.  $4 \log_2 x + \log_2 5 = \log_2 405$

16.  $\log_6 (2x - 5) + 1 = \log_6 (7x + 10)$

17.  $\log_{16} (9x + 5) - \log_{16} (x^2 - 1) = \frac{1}{2}$

18.  $\log_8 (n - 3) + \log_8 (n + 4) = 1$

19.  $\log_6 (3m + 7) - \log_6 (m + 4) = 2 \log_6 6 - 3 \log_6 3$

20.  $\log_2 (2x + 8) - \log_2 (2x^2 + 21x + 61) = -3$

p. 476 #33-51 odd.

Solve each equation.

33.  $\log_a x = 2 \log_a 3 + \log_a 5$   $x=45$

34.  $\log_a x = \frac{3}{2} \log_a 9 + \log_a 2$   $x=54$

35.  $\log_b (x + 3) = \log_b 8 - \log_b 2$   $x=1$

36.  $\log_b (x^2 + 7) = \frac{2}{3} \log_b 64$   $x=\pm 3$

37.  $\log_a x - \log_a (x - 5) = \log_a 6$   $x=6$

38.  $\log_a (3x + 5) - \log_a (x - 5) = \log_a 8$   $x=9$

39.  $\log_2 (x^2 - 9) = 4$

$x=\pm 5$

40.  $\log_3 (x + 2) + \log_3 6 = 3$   $x=\frac{5}{2}$

41. If  $f(x) = \log_2 x$  and  $g(x) = 4^x$ , find:

a.  $f(g(3)) = 6$  b.  $g\left(f\left(\frac{1}{2}\right)\right) = \frac{1}{4}$  c.  $f(g^{-1}(16)) = 1$

45.  $\log_5 (\log_3 x) = 0$   $x=3$

47.  $\log_6 (x + 1) + \log_6 x = 1$   $x=2$

49.  $\frac{1}{2} \log_a (x + 2) + \frac{1}{2} \log_a (x - 2) = \frac{2}{3} \log_a 27$   $x=\sqrt{85}$

50.  $2 \log_3 x - \log_3 (x - 2) = 2$   $x=3, 6$

51.  $\log_b (x - 1) + \log_b (x + 2) = \log_b (8 - 2x)$   $x=2$