Math 3 Unit 9 Worksheet 6 **Name:_____**
Solving Logarithmic Equations Using the Laws of Logarithms **Date:_____Period:_____**

Solve for *x*.

1. $3\log_5 4 = \log_5 2x$

2. $2\ln 9 = \ln 3x$

3. $2\log_8 x = \log_8 100$

4. $\log_7 x = \log_7 2 + \log_7 3$

5. $\log_6 x = 2\log_6 3 + \log_6 5$

6. $\log_5(x+3) = \log_5 8 - \log_5 2$

7. $\log x - \log(x-5) = \log 6$

8. $\ln(3x+5) - \ln(x-5) = \ln 8$

9. $\log_{11} x = \frac{3}{2}\log_{11} 9 + \log_{11} 2$

10. $\log x^{\frac{4}{3}} = \log 32 - \log 2$

11. $\log_6 9 + \log_6 x = 2$

12. $\log x + \log 25 = 3$

13. $\log_2 52 - \log_2 x = 2$

14. $2\log_6 2 + \log_6 18x = 3$

15. $\log_\pi 5 + \log_\pi x = 7$

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

17. $2\log_4 x = 3$

18. $\ln x + \ln 5 = 4$

19. $\ln x - \ln 6 = 2$

20. $\log_2 4x - \log_2(x - 1) = 3$

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

22. $2\log 2 + \log x = 2$

23. $2\ln 7 + \ln x = 4$

24. $\log 20 + \log 5 = x$

25. $\log_6 9 + \log_6 4 = x$

26. $\log_5(2x-7) = 0$

27. $\ln(x-9) = 1$

28. $\log_x 2 + \log_x 4 = \frac{3}{2}$

29. Identify which step has the error in the solution of

$2\log_7 x = \log_7 2 + \log_7 50$

Step 1: $2\log_7 x = \log_7 2 \cdot 50$

Step 2: $2\log_7 x = \log_7 100$

Step 3: $\log_7 x = \log_7 \frac{100}{2}$

Step 4: $\log_7 x = \log_7 50$

Step 5: $x = 50$

30. Which line has an error in it?

$\log_6 6 + \log_6 \sqrt{6} = x$

1. $\log_6 6\sqrt{6} = x$
2. $6^x = 6\sqrt{6}$
3. $6^x = 6^1 \cdot 6^{\frac{1}{2}}$
4. $6^x = 6^{\frac{1}{2}}$
5. $x = \frac{1}{2}$

31. Which student solved for *x* correctly in the following problem? $2 \log x = 4$

Alice	Bao	Carlos	David
$2 \log x = 4$	$2 \log x = 4$	$2 \log x = 4$	$2 \log x = 4$
$\log x^2 = 4$	$\log x^2 = 4$	$\log x^2 = 4$	$\log x^2 = 4$
$x^2 = 4$	$x^2 = 4$	$x^2 = 10^4$	$x^2 = 10^4$
$x = 2$	$x = \pm 2$	$x^2 = 10000$	$x^2 = 10000$
		$x = 100$	$x = \pm 100$

32. Which student solved for x correctly in the following problem?

$2 \log 3 + \log x = \log 36$

Ariadna

$2 \log 3 + \log x = \log 36$
$\log 9 + \log x = \log 36$
$\log 9x = \log 36$
$9x = 36$
$x = 4$

Bella

$2 \log 3 + \log x = \log 36$
$\log 9 + \log x = \log 36$
$\log (9 + x) = \log 36$
$9 + x = 36$
$x = 27$

Choua

$2 \log 3 + \log x = \log 36$
$2(\log 3 + \log x) = \log 36$
$2 \log 3x = \log 36$
$\log 3x^2 = \log 36$
$3x^2 = 36$
$x^2 = 12$
$x = \sqrt{12}$

Domingo

$2 \log 3 + \log x = \log 36$
$2(\log 3 + \log x) = \log 36$
$2 \log 3x = \log 36$
$\log (3x)^2 = \log 36$
$9x^2 = 36$
$x^2 = 4$
$x = 2$