Equations Requiring Logs:

4. Isolate the base with its exponent
5. Rewrite into log form
6. Solve by using change of base

$\log_b x = \frac{\log x}{\log b}$

Example 5:

$13^m = 2$

$\log_{13} 2 = m \qquad \frac{\log 2}{\log 13}$

$m = .2702$

Example 6:

$2^{-5.6b} - 5 = 28$

$+5 \quad +5$

$2^{-5.6b} = 33$

$\log_2 33 = -5.6b$

$\frac{\log 33}{\log 2} = -5.6b$

$\frac{5.044}{-5.6} = \frac{-5.6b}{-5.6}$

$b = -.9008$

Example 7:

$20^{5n+5} - 3 = 93$

$+3 \quad +3$

$20^{5n+5} = 96$

$\log_{20}(96) = 5n+5$

$\frac{\log(96)}{\log 20} = 5n+5$

$\frac{-5.0000}{1.5236} = 5n+5$

-5

$\frac{-3.4764}{5} = \frac{5n}{5} \rightarrow n = -.6953$

Example 8:

$-3 \cdot 8^{k+0.1} = -81$

$\frac{}{-3} \quad \frac{}{-3}$

$8^{k+0.1} = 27$

$\log_8(27) = k+0.1$

$\frac{\log(27)}{\log(8)} = k+0.1$

$1.5850 = k+0.1$

$-0.1 \quad -0.1$

$1.4850 = k$

Equations Requiring Log

Algebra 2 Name Answer Key ID: 1

Exponential Equations - HW Day 2 Date _____ Period ___

Solve each equation. Round your answers to the nearest ten-thousandth.

1) $11^x = 32$

$\log_{11} 32 = x$

$1.4453 = x$

$\frac{\log 32}{\log 11} = x$

2) $9^p = 84$

$\log_9 84 = p$

$2.01166 = p$

3) $2^n = 28$

$\log_2 28 = n$

$4.8074 = n$

4) $11^b = 47$

$\log_{11} 47 = b$

$1.6056 = b$

5) $4^{x+3} = 27$

$\log_4 27 = x+3$

$2.3774 = x+3$

$-3 \quad -3$

$-0.6226 = x$

6) $16^{8r} = 60$

$\log_{16} 60 = 8r$

$\frac{1.4767}{8} = \frac{8r}{8}$

$0.1846 = r$

7) $17^{6.2a} = 28$

$\log_{17} 28 = 6.2a$

$\frac{1.1761}{6.2} = \frac{6.2a}{6.2}$

$0.1897 = a$

8) $7^{a-1} = 65$

$\log_7 65 = a-1$

$2.1452 = a-1$

$+1 \quad +1$

$3.1452 = a$

9) $16^{-9v} - 8 = 80$

$+8 \quad +8$

$16^{-9v} = 88$

$\log_{16} 88 = -9v$

$1.6149 = -9v$

$\frac{1.6149}{-9} = \frac{-9v}{-9}$

$-0.1794 = v$

10) $19^{k-3} + 10 = 97$

$-10 \quad -10$

$19^{k-3} = 87$

$\log_{19} 87 = k-3$

$1.5167 = k-3$

$+3 \quad +3$

$4.5167 = k$

11) $3^{x+7.8} - 4.3 = 25$

12) $10^{k-9} - 6 = 22$

13) $12^{5m-5} + 6 = 87$

14) $12^{10x-7.8} - 10 = 48$

15) $\frac{-2 \cdot 5^{7v+1}}{-2} = \frac{-57}{-2}$

$5^{7v+1} = 28.5$

$\log_5 28.5 = 7v+1$

$2.0814 = 7v+1$

$-1 \quad -1$

$\frac{1.0814}{7} = \frac{7v}{7}$

$0.1545 = v$

16) $10^{10x+9} - 7 = 92$

17) $20^{-8n-10} - 6 = 76$

18) $16^{8-7n} + 10 = 99$

19) $\frac{5 \cdot 11^{7x-7}}{5} = \frac{30}{5}$

$11^{7x-7} = 6$

$\log_{11} 6 = 7x-7$

$0.7472 = 7x-7$

$+7 \quad +7$

$7.7472 = 7x$

$\frac{7.7472}{7} = \frac{7x}{7}$

$1.1067 = x$

20) $4^{4a-6} - 10 = 41.3$