Honors Algebra 2 Name_____

Logarithm Review

Date_____ Period____

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

1) $20^{0.3n} + 3 = 29$

2) $12^{-9x} - 3 = 85$

3) $11^{10k} + 7 = 82$

4) $17^{a-5} - 7 = 44$

5) $7 \cdot 7^{b-6} - 9.8 = 42$

6) $-5.3 \cdot 20^{x-5} + 2 = -48.9$

7) $-10^{-7b} + 9 = -83$

8) $-7 \cdot 20^{-9a} + 6 = -60$

Solve each equation.

9) $\log_4(-4x - 8) = \log_4 -3x$

10) $\log_6 5x = \log_6(x + 4)$

11) $\log_{13}(3p + 4) = \log_{13}(4p + 1)$

12) $\log_{16}(2r + 6) = \log_{16}(9 - r)$

13) $\log_{14}(-2x + 3) = \log_{14}(-3x - 8)$

14) $\log_{17}(-3n - 2) = \log_{17} -2n$

15) $\log_7 10 + \log_7 (-5x - 8) = 1$

16) $\log_9 (x - 3) - \log_9 (x + 1) = 1$

17) $\log_6 x + \log_6 3 = \log_6 75$

18) $\log_5 8 - \log_5 (-x - 4) = \log_5 66$

19) $\log_3 6 + \log_3 x = 5$

20) $\log_6 5x + \log_6 4 = 1$

21) $\log_2 6 - \log_2 4x = 4$

22) $\log_3 (x + 3) - \log_3 (x - 6) = \log_3 11$

23) $\log_6 2x - \log_6 10 = 1$

24) $\log_6 9 - \log_6 x = 3$

Rewrite each equation in exponential form.

25) $\log_{289} 17 = \frac{1}{2}$

26) $\log_8 a = b$

27) $\log_n m = -\frac{7}{6}$

28) $\log_6 \frac{1}{216} = -3$

Rewrite each equation in logarithmic form.

29) $16^{y} = x$

30) $64^{\frac{1}{2}} = 8$

31) $14^{2} = 196$

32) $17^{a} = b$

Expand each logarithm.

33) $\ln\left(x^{5} \cdot y\right)^{4}$

34) $\log_{6}\left(u \cdot v \cdot w^{6}\right)$

35) $\log_{7}\left(\frac{x}{y^{3}}\right)^{6}$

36) $\log_{4}\left(u^{3}v^{6}\right)$

Condense each expression to a single logarithm.

37) $6\log_{4} x + 12\log_{4} y$

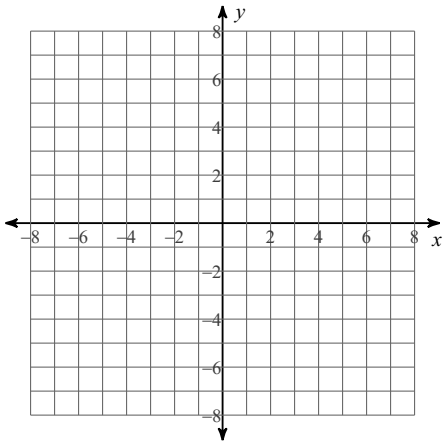
38) $\log_{3} z + \frac{\log_{3} x}{2} + \frac{\log_{3} y}{2}$

39) $2\log_{8} 12 + 8\log_{8} 5$

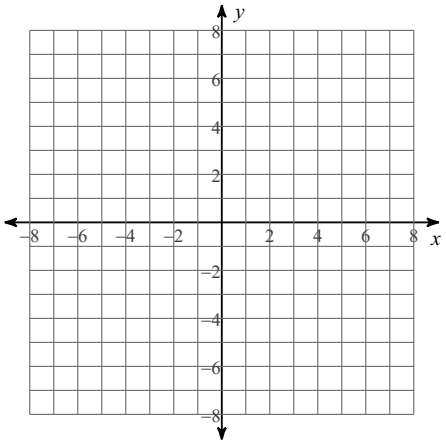
40) $4\log_{7} a + 16\log_{7} b$

Identify the domain and range of each. Then sketch the graph.

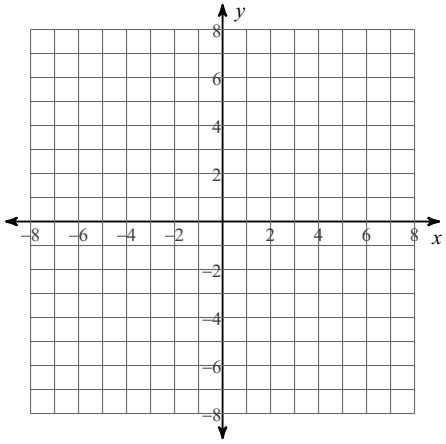
41) $y = \log_3 (x + 6) + 3$



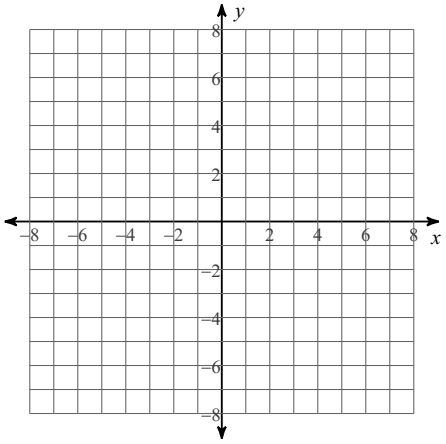
42) $y = \ln (x + 4) - 2$



43) $y = \log_5 (x - 1) + 5$



44) $y = \log_5 (x - 2) + 2$



Use a calculator to approximate each to the nearest thousandth.

45) $\log_2 62$

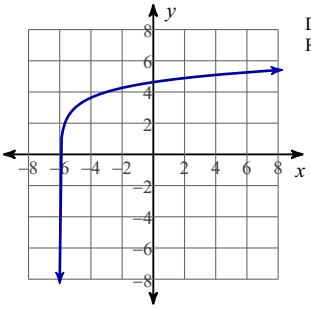
46) $\log_2 50$

47) $\log_2 35$

48) $\log_5 1$

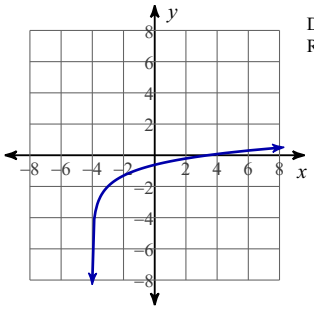
Answers to Logarithm Review

1) 3.6253
2) –0.2002
3) 0.1801
4) 6.3878
5) 7.0286
6) 5.7551
7) –0.2805
8) –0.0832
9) $\{-8\}$
10) $\{1\}$
11) $\{3\}$
12) $\{1\}$
13) $\{-11\}$
14) $\{-2\}$
15) $\left\{-\frac{87}{50}\right\}$
16) No solution.
17) $\{25\}$
18) $\left\{-\frac{136}{33}\right\}$
19) $\left\{\frac{81}{2}\right\}$
20) $\left\{\frac{3}{10}\right\}$
21) $\left\{\frac{3}{32}\right\}$
22) $\left\{\frac{69}{10}\right\}$
23) $\{30\}$
24) $\left\{\frac{1}{24}\right\}$
25) $289^{\frac{1}{2}} = 17$
26) $8^{b} = a$
27) $n^{-\frac{7}{6}} = m$
28) $6^{-3} = \frac{1}{216}$
29) $\log_{16} x = y$
30) $\log_{64} 8 = \frac{1}{2}$
31) $\log_{14} 196 = 2$
32) $\log_{17} b = a$
33) $20 \ln x + 4 \ln y$
34) $\log_6 u + \log_6 v + 6 \log_6 w$
35) $6 \log_7 x - 18 \log_7 y$
36) $3 \log_4 u + 6 \log_4 v$
37) $\log_4 \left(y^{12} x^6\right)$
38) $\log_3 \left(z\sqrt{yx}\right)$
39) $\log_8 \left(5^8 \cdot 12^2\right)$
40) $\log_7 \left(b^{16} a^4\right)$
41)



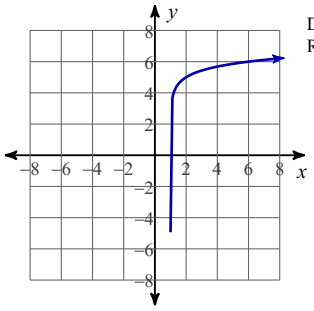
Domain: $x > -6$
Range: All reals

42)



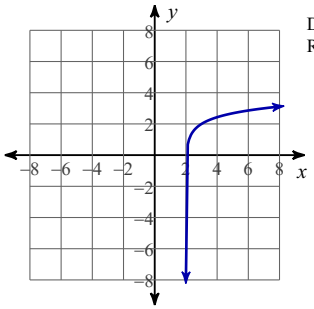
Domain: $x > -4$
Range: All reals

43)



Domain: $x > 1$
Range: All reals

44)



Domain: $x > 2$
Range: All reals

45) 5.954
46) 5.644
47) 5.129
48) 0