

## Unit 9A Test Review

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

1)  $-2^{x+2} = -34$

$2^{x+2} = 34$

$\log_2 34 = x+2$

$5.0875 = x+2$

$3.0875 = x$

3)  $3^{9x} + 7 = 39$

$3^{9x} = 32$

$\log_3 32 = 9x$

$3.1546 = 9x$

$0.3505 = x$

2)  $8e^{k+2} = 20$

$e^{k+2} = 2.5$

$\ln 2.5 = k+2$

$0.9163 = k+2$

$-1.0837 = k$

4)  $10^{v+1} + 1 = 69$

$10^{v+1} = 68$

$\log_{10} 68 = v+1$

$1.8325 = v+1$

$0.8325 = v$

Expand each logarithm.

5)  $\log_8 (x^6 \cdot y)^5$

$\log_8 (x^{30} y^5)$

$\log_8 x^{30} + \log_8 y^5$

$30 \log_8 x + 5 \log_8 y$

6)  $\log_6 \frac{6a}{b^4}$

$\log_6 6 + \log_6 a - \log_6 b^4$

$1 + \log_6 a - 4 \log_6 b$

7)  $\ln (c\sqrt{a \cdot b})$

$\ln a^{1/2} b^{1/2} c$

$\ln a^{1/2} + \ln b^{1/2} + \ln c$

$\frac{1}{2} \ln a + \frac{1}{2} \ln b + \ln c$

8)  $\log_5 \frac{u^5}{v^3}$

$\log_5 u^5 - \log_5 v^3$

$5 \log_5 u - 3 \log_5 v$

Condense each expression to a single logarithm.

9)  $5 \log_6 x - 30 \log_6 y$

$\log_6 x^5 - \log_6 y^{30}$

$\log_6 \frac{x^5}{y^{30}}$

10)  $3 \ln u - 6 \ln v$

$\ln u^3 - \ln v^6$

$\ln \frac{u^3}{v^6}$

11)  $30 \log_4 a + 6 \log_4 b$

$\log_4 a^{30} + \log_4 b^6$

$\log_4 a^{30} b^6$

12)  $\log_5 7 + \frac{\log_5 11}{3} + \frac{\log_5 6}{3}$

$\log_5 7 + \frac{1}{3} \log_5 11 + \frac{1}{3} \log_5 6$

$\log_5 7 + \log_5 11^{1/3} + \log_5 6^{1/3}$

$-\log_5 (7 \cdot 11^{1/3} \cdot 6^{1/3}) = \log_5 \sqrt[3]{66}$

Solve each equation.

13)  $\log -2n = \log (2n + 3)$

$-2n = 2n + 3$

$-4n = 3$

$n = -\frac{3}{4}$

14)  $\log_{14} (-2n - 6) = \log_{14} 29$

$-2n - 6 = 29$

$-2n = 35$

$n = -\frac{35}{2}$

15)  $\log_5 9 - \log_5 -3x = \log_5 14$

$\log_5 \frac{9}{-3x} = \log_5 14$

$\frac{9}{-3x} = 14$

$9 = -42x$

$x = -\frac{9}{42} = -\frac{3}{14}$

16)  $\log_9 (x - 1) + \log_9 8 = \log_9 44$

$\log_9 (8x - 8) = \log_9 44$

$8x - 8 = 44$

$8x = 52$

$x = \frac{52}{8} = \frac{13}{2}$

17)  $\log_3 2x^2 + \log_3 2 = 4$

$\log_3 4x^2 = 4$      $x = \pm \sqrt{\frac{81}{4}}$

$3^4 = 4x^2$

$81 = 4x^2$

$\frac{81}{4} = x^2$

$x = \frac{9}{2}, -\frac{9}{2}$

18)  $\log_3 5 - \log_3 (x - 4) = 3$

$\log_3 \frac{5}{x-4} = 3$

$27x = 113$

$3^3 = \frac{5}{x-4}$

$27 = \frac{5}{x-4}$

$27x - 108 = 5$

$x = \frac{113}{27}$

19)  $5^{-3x-2} = 5^{-2x}$

$-3x - 2 = -2x$

$-2 = x$

20)  $\left(\frac{1}{4}\right)^{2r} = 64$

$(4^{-1})^{2r} = 4^3$

$-2r = 3$

$r = -\frac{3}{2}$

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

21)  $7 \cdot 10^{b-5} = 1.3$

$10^{b-5} = \frac{1.3}{7}$

$\log \frac{1.3}{7} = b - 5$

$-0.7312 = b - 5$

$4.2688 = b$

23)  $11^{7b} + 7 = 8$

$11^{7b} = 1$

$\log_{11} 1 = 7b$

$0 = 7b$

$0 = b$

22)  $11^{x+6} + 8 = 45$

$11^{x+6} = 37$

$\log_{11} 37 = x + 6$

$1.5059 = x + 6$

$-4.4941 = x$

24)  $3^{x-0.3} + 6 = 57$

$3^{x-0.3} = 51$

$\log_3 51 = x - 0.3$

$3.5789 = x - 0.3$

$3.8789 = x$