AFM UNIT 1 Name Key

HW 1 - INTRO TO LOGS, LOG PROPERTIES

Rewrite each equation in exponential form.

1) $\log_y x = \frac{7}{6}$ $y^{\frac{7}{6}} = x$

2) $\log_{\frac{14}{19}} x = y$ $\left(\frac{14}{19}\right)^y = x$

3) $\log_n 59 = m$ $n^m = 59$

4) $\log_5 25 = 2$ $5^2 = 25$

5) $\log_n 134 = -16$ $n^{-16} = 134$

6) $\log_{16} y = x$ $16^x = y$

Rewrite each equation in logarithmic form.

7) $6^3 = 216$ $\log_6 216 = 3$

8) $x^y = 192$ $\log_x 192 = y$

9) $19^2 = 361$ $\log_{19} 361 = 2$

10) $256^{\frac{1}{2}} = 16$ $\log_{256} 16 = \frac{1}{2}$

11) $17^{-2} = \frac{1}{289}$ $\log_{17} \frac{1}{289} = -2$

12) $\left(\frac{3}{4}\right)^y = x$ $\log_{\frac{3}{4}} x = y$

Evaluate each expression.

13) $\log_3 81$ 4

14) $\log_2 \frac{1}{4}$ -2

15) $\log_6 \frac{1}{36}$ -2

16) $\log_6 36$ 2

Write each logarithm using Change of Base. Use a calculator to approximate each to three decimal places.

17) $\log_4 2.3$ $\frac{\log 2.3}{\log 4} = .6008$

18) $\ln 7$ $\frac{\ln 7}{\ln e} = 1.9459$

19) $\log_6 4.9$ $\frac{\log 4.9}{\log 6} = .8870$

20) $\log 1.3$ $\frac{\log 1.3}{\log 10} = .1139$

21) $\log_4 52$ $\frac{\log 52}{\log 4} = 2.8502$

22) $\log_4 3.5$ $\frac{\log 3.5}{\log 4} = .9037$

Condense each expression to a single logarithm.

23) $2\log_4 a + 6\log_4 b$ $\log_4 a^2 + \log_4 b^6$ $\log_4 a^2 b^6$ $\log_4 (ab^3)^2$

24) $4\log_4 x - 6\log_4 y$ $\log_4 x^4 - \log_4 y^6$ $\log_4 \frac{x^4}{y^6}$ $\log_4 \left(\frac{x^2}{y^3}\right)^2$

25) $\log_7 a + \log_7 b + 3\log_7 c$ $\log_7 abc^3$

26) $\log_3 6 + \log_3 7 + 6\log_3 11$ $\log_3 (6 \cdot 7 \cdot 11^6)$ $\log_3 (74405562)$

27) $3\log_4 w + \frac{\log_4 u}{3}$ $\log_4 w^3 + \frac{1}{3}\log_4 u$ $\log_4 w^3 \sqrt[3]{u}$

28) $4\log_8 u - 20\log_8 v$ $\log_8 u^4 - \log_8 v^{20}$ $\log_8 \frac{u^4}{v^{20}}$ $\log_8 \left(\frac{u}{v^5}\right)^4$

29) $\frac{\log_3 5}{3} + \frac{\log_3 7}{3} + \frac{\log_3 12}{3}$ $\frac{1}{3}\log_3 5 + \frac{1}{3}\log_3 7 + \frac{1}{3}\log_3 12$ $\log_3 \sqrt[3]{420}$

30) $2\log_9 c + \frac{\log_9 a}{2}$ $\log_9 c^2 + \log_9 a^{\frac{1}{2}}$ $\log_9 c^2 \sqrt{a}$

Expand each logarithm.

31) $\log_6 (x^6 y^5)$ $6\log_6 x + 5\log_6 y$

32) $\log_5 \left(\frac{a^2}{b}\right)^6$ $6\log_5 \left(\frac{a^2}{b}\right)$ $12\log_5 a - 6\log_5 b$

33) $\log_2 (11^6 \sqrt[3]{12})$ $\log_2 11^6 + \log_2 12^{\frac{1}{3}}$ $6\log_2 11 + \frac{\log_2 12}{3}$

34) $\log_6 \left(\frac{2}{11^4}\right)^4$ $4\log_6 2 - 4\log_6 11^4$ $4\log_6 2 - 16\log_6 11$

35) $\log_5 \left(\frac{x^2}{y}\right)^4$ $4\log_5 x^2 - 4\log_5 y$ $8\log_5 x - 4\log_5 y$

36) $\log_6 (z^4 \sqrt[3]{x})$ $4\log_6 z + \frac{1}{3}\log_6 x$ $4\log_6 z + \frac{\log_6 x}{3}$

37) $\log_8 (7\sqrt[3]{6 \cdot 11})$ $\log_8 7 + \frac{\log_8 6}{3} + \frac{\log_8 11}{3}$

38) $\log_4 (ab^6)^2$ $2\log_4 a + 2\log_4 b^6$ $2\log_4 a + 12\log_4 b$