Worksheet Section 8.5 v04
F2009 Math 098
Dressler

Name_____

Write the expression as a single logarithm.

1) $3\log_9 10 + \log_9 6$

2) $4\log_7 7 + \log_7 5$

3) $4\log_8 10 - 3\log_8 2$

4) $-\log_m n + 3\log_m m$

5) $\log_8 \sqrt[5]{x} + 6\log_8 x - \log_8 x^3$

6) $\frac{1}{6}(2\log_4 x - 4\log_4 z)$

7) $3\log_2 (2x - 6) + 4\log_2 (3x - 7)$

8) $\frac{1}{3}[\log_w (x^2 - 36) - \log_w (x - 6)]$

9) $\log_q q - \log_q r + 5\log_q p$

10) $\log_t t - \log_t s + 5\log_t u$

11) $4\log_{10} 5 - 2\log_{10} 4$

12) $-\log_t s + 5\log_t t$

13) $\log_7 \sqrt[5]{x} + 6\log_7 x - \log_7 x^4$

14) $\frac{1}{3}(6\log_2 x - 5\log_2 z)$

15) $3\log_6 (4x + 6) + 2\log_6 (2x + 1)$

16) $\frac{1}{3}[\log_w (x^2 - 49) - \log_w (x - 7)]$

17) $\log_t t - \log_t s + 6\log_t u$

18) $5\log_b m - \frac{5}{3}\log_b n + \frac{1}{5}\log_b j - 2\log_b k$

19) $6\log_b m - \frac{5}{3}\log_b n + \frac{1}{2}\log_b j - 4\log_b k$

20) $3\log_6 (3x - 5) + 4\log_6 (5x - 8)$

21) $3\log_5 (4x + 8) + 4\log_5 (2x + 1)$

22) $\log_q q - \log_q r + 6\log_q p$

Write the expression as the sum or difference of logarithms.

23) $\log_4 2x^7$

24) $\log_4 3x^7$

25) $\log_x x^6 y^9$

26) $\log_3 \frac{x^9 y^6}{4}$

27) $\log_{14} \sqrt{30\,r}$

28) $\log_b \frac{m^6}{n^3}$

29) $\log_b \sqrt[3]{\frac{x^9}{y^2}}$

30) $\log_b \frac{m^4 p^3}{n^9}$

31) $\log_b \frac{m^6}{(m - n)^2}$

32) $\log_b \frac{m^3}{(m - n)^8}$

33) $\log_b \frac{\sqrt[4]{x^7 b^2}}{y^4}$

34) $\log_x x^4 y^2$

35) $\log_5 \frac{x^9 y^3}{8}$

36) $\log_{14} \sqrt{31\,m}$

37) $\log_b \frac{m^5}{n^3}$

38) $\log_b \sqrt[3]{\frac{x^4}{y^6}}$

39) $\log_b \frac{m^2 p^6}{n^3}$

40) $\log_b \frac{m^9}{(m - n)^5}$

41) $\log_b \frac{\sqrt[4]{x^9 b^7}}{y^5}$

42) $\log_b \frac{\sqrt[4]{x^2 b^3}}{y^8}$

Solve.

43) The formula for the pH of a solution is given by the logarithmic equation $pH = -\log [H^+]$, where $[H^+]$ is the concentration of hydrogen ions. The concentration of hydrogen ions of a specific solution is 10^{-13}. Calculate the pH of this solution.

44) The formula for the pH of a solution is given by the logarithmic equation $pH = -\log [H^+]$, where $[H^+]$ is the concentration of hydrogen ions. The concentration of hydrogen ions of a specific solution is 10^{-11}. Calculate the pH of this solution.

45) The height in feet of males in a certain ethnic group is approximated by $H = 2.8 + 2 \log\left(\frac{t}{1.1}\right)$ where t is the boy's age and $1 \le t \le 18$. Use the properties of logarithms to write the expression on the right side of the equation so that it does not contain the logarithm of a quotient.

46) The height in feet of males in a certain ethnic group is approximated by $H = 2.6 + 2 \log\left(\frac{t}{1.1}\right)$ where t is the boy's age and $1 \le t \le 18$. Use the properties of logarithms to write the expression on the right side of the equation so that it does not contain the logarithm of a quotient.

47) The height in feet of males in a certain ethnic group is approximated by $H = 2.5 + 2 \log\left(\frac{t}{1.2}\right)$ where t is the boy's age and $1 \le t \le 18$. Use the properties of logarithms to write the expression on the right side of the equation so that it does not contain the logarithm of a quotient.

48) The height in feet of males in a certain ethnic group is approximated by $H = 2.7 + 2 \log (0.81t)$ where t is the boy's age and $1 \le t \le 18$. Use the properties of logarithms to write the expression on the right side of the equation so that it does not contain the logarithm of a product.

49) The height in feet of males in a certain ethnic group is approximated by $H = 2.8 + 2 \log (0.83t)$ where t is the boy's age and $1 \le t \le 18$. Use the properties of logarithms to write the expression on the right side of the equation so that it does not contain the logarithm of a product.

50) The formula for the pH of a solution is given by the logarithmic equation $pH = -\log [H^+]$, where $[H^+]$ is the concentration of hydrogen ions. The concentration of hydrogen ions of a specific solution is 10^{-11}. Calculate the pH of this solution.

51) The height in feet of males in a certain ethnic group is approximated by $H = 2.5 + 2 \log\left(\frac{t}{1.1}\right)$ where t is the boy's age and $1 \le t \le 18$. Use the properties of logarithms to write the expression on the right side of the equation so that it does not contain the logarithm of a quotient.

Answer Key
Testname: WS8.5V04

1) $\log_9 6000$

2) $\log_7 12{,}005$

3) $\log_8 1250$

4) $\log_m \frac{m^3}{n}$

5) $\frac{16}{5}\log_8 x$

6) $\log_4 \sqrt[6]{\frac{x^2}{z^4}}$

7) $\log_2 (2x - 6)^3(3x - 7)^4$

8) $\log_w \sqrt[3]{x + 6}$

9) $\log_q \frac{qp^5}{r}$

10) $\log_t \frac{tu^5}{s}$

11) $\log_{10} \frac{625}{16}$

12) $\log_t \frac{t^5}{s}$

13) $\frac{11}{5}\log_7 x$

14) $\log_2 \sqrt[3]{\frac{x^6}{z^5}}$

15) $\log_6 (4x + 6)^3(2x + 1)^2$

16) $\log_w \sqrt[3]{x + 7}$

17) $\log_t \frac{tu^6}{s}$

18) $\log_b \frac{m^5 j^{1/5}}{n^{5/3} k^2}$

19) $\log_b \frac{m^6 j^{1/2}}{n^{5/3} k^4}$

20) $\log_6 (3x - 5)^3(5x - 8)^4$

21) $\log_5 (4x + 8)^3(2x + 1)^4$

22) $\log_q \frac{qp^6}{r}$

23) $\log_4 2 + 7\log_4 x$

24) $\log_4 3 + 7\log_4 x$

25) $6\log_x x + 9\log_x y$

26) $9\log_3 x + 6\log_3 y - \log_3 4$

27) $\frac{1}{2}\log_{14} 30 + \frac{1}{2}\log_{14} r$

28) $6\log_b m - 3\log_b n$

29) $3\log_b x - \frac{2}{3}\log_b y$

30) $4\log_b m + 3\log_b p - 9\log_b n$

31) $6\log_b m - 2\log_b (m - n)$

32) $3\log_b m - 8\log_b (m - n)$

33) $\frac{7}{4}\log_b x + \frac{1}{2} - 4\log_b y$

34) $4\log_x x + 2\log_x y$

35) $9\log_5 x + 3\log_5 y - \log_5 8$

36) $\frac{1}{2}\log_{14} 31 + \frac{1}{2}\log_{14} m$

37) $5\log_b m - 3\log_b n$

38) $\frac{4}{3}\log_b x - 2\log_b y$

39) $2\log_b m + 6\log_b p - 3\log_b n$

40) $9\log_b m - 5\log_b (m - n)$

41) $\frac{9}{4}\log_b x + \frac{7}{4} - 5\log_b y$

42) $\frac{1}{2}\log_b x + \frac{3}{4} - 8\log_b y$

43) 13

44) 11

45) $H = 2.8 + 2(\log t - \log 1.1)$

46) $H = 2.6 + 2(\log t - \log 1.1)$

47) $H = 2.5 + 2(\log t - \log 1.2)$

48) $H = 2.7 + 2(\log 0.81 + \log t)$

49) $H = 2.8 + 2(\log 0.83 + \log t)$

50) 11

51) $H = 2.5 + 2(\log t - \log 1.1)$