

1 Simplify the expression by using the definition and properties of logarithms.

$$\log_{10} 9000 - \log_{10} 9$$

Problem code:
copc06.05.04.01

2 Simplify the expression by using the definition and properties of logarithms.

$$\log_{10} 400 + \log_{10} \left(\frac{5}{2} \right)$$

Problem code:
copc06.05.04.02

3 Simplify the expression by using the definition and properties of logarithms.

$$\ln e^3 - \ln e$$

Problem code:
copc06.05.04.06

4 Write the expression as a single logarithm with a coefficient of 1.

$$\log_{10} 40 + \log_{10} 4$$

a. $\log_{10} 44$

b. $\log_{10} 166$

c. $\log_{10} 160$

d. $\log_{160} 10$

e. $\log_{10} 36$

Problem code:
copc06.05.04.11m

5 Write the expression as a single logarithm with a coefficient of 1.

$$2\log_{10} x - 5\log_{10} y$$

a. $-3\log_{10} \left(\frac{x}{y} \right)$

c. $\log_{10} \frac{x^2}{y^5}$

e. $\log_{10} (2x - 5y)$

b. $\log_{10} (x^2 - y^5)$

d. $\log_{10} \frac{2x}{5y}$

Problem code:
copc06.05.04.12m

- 6 Write the quantity using sums and differences of simpler logarithmic expressions. Express the answer so that logarithms of products, quotients, and powers do not appear.

$$\ln \frac{x^7}{\sqrt[3]{1+x^7}}$$

a. $7 \ln x - \frac{1}{3} \ln(1+x^7)$

d. $\frac{2 \ln x}{\ln(1+x^7)}$

b. $9 \ln x - 7 \ln(1+x)$

e. $2 \ln x + 3 \ln(1+x^7)$

c. $7 \ln x^7 - 3 \ln(1+x^7)$

Problem code:

copc06.05.04.21m

- 7 Write the quantity using sums and differences of simpler logarithmic expressions. Express the answer so that logarithms of products, quotients, and powers do not appear.

$$\ln \frac{x \sqrt[9]{8x+1}}{4x+1}$$

a. $\frac{9 \ln x + \ln(8x+1)}{\ln(4x+1)}$

d. $\frac{1}{9} \ln x + \ln(8x) + \frac{1}{9(4x+1)}$

b. $\ln x + \frac{1}{9} \ln(8x+1) - \ln \frac{1}{4x+1}$

e. $\ln x + \ln \frac{8x+1}{9} - \ln(4x+1)$

c. $\ln x + \frac{1}{9} \ln(8x+1) - \ln(4x+1)$

Problem code:

copc06.05.04.22m

8 Suppose that $\log_{10} A = a$, $\log_{10} B = b$, and $\log_{10} C = c$. Express the following logarithms in terms of a , b , and c .

$$\log_{10} \left(10A / \sqrt[4]{BC} \right)$$

a. $2 + 4a - b - c$

c. $\frac{4a}{bc}$

e. $1 + a - \frac{1}{4}b - \frac{1}{4}c$

b. $10 + a + \frac{1}{4}b + c$

d. $\frac{1 \cdot a}{\sqrt[4]{b \cdot c}}$

Problem code:

copc06.05.04.37m

9 Solve the equation. Express the answer in terms of natural logarithms.

$$5 = 2e^{2x - 1}$$

a. $x = \ln 2 + \ln 5 + 1$

c. $x = \frac{\ln 5 - \ln 2 + 1}{2}$

e. $x = \ln 5 - \ln 2 + 1$

b. $x = \left(\frac{\ln 5}{2} + 1 \right) \div 2$

d. $x = \frac{\ln 2 + \ln 5 + 1}{4}$

Problem code:

copc06.05.04.43m

10 Solve the equation. Express the answer in terms of natural logarithms.

$$5e^{3+t} = 3$$

a. $t = \ln 5 - \ln 3 + 3$

c. $t = - \frac{\ln 3 + 3}{5}$

e. $t = \frac{\ln 3}{5} - 3$

b. $t = \ln 3 - \ln 5 - 3$

d. $t = \frac{\ln 5 - 3}{3}$

Problem code:

copc06.05.04.44m

11 Express the quantity in terms of base 10 logarithms.

$$\log_2 7$$

a. $\log_{10} 7 + \log_{10} 2$

c. $\log_{10} 7 - \log_{10} 2$

e. $\log_{10} 14$

b. $(\log_{10} 7)(\log_{10} 2)$

d. $\frac{\log_{10} 7}{\log_{10} 2}$

Problem code:

copc06.05.04.51m

12 Express the quantity in terms of base 10 logarithms.

$$\log_6 10$$

a. $1 - \log_{10} 6$

b. $\log_{10} 6$

c. $1 + \log_{10} 6$

d. $\frac{1}{\log_{10} 6}$

e. $\log_{10} 60$

Problem code:

copc06.05.04.52m

13 Express the quantity in terms of natural logarithms.

$$\log_{10} 5$$

a. $\ln(50)$

c. $(\ln 5)(\ln 10)$

e. $\frac{\ln 5}{\ln 10}$

b. $\ln 5 - \ln 10$

d. $\ln 5 + \ln 10$

Problem code:

copc06.05.04.57m

ANSWER KEY

Homework 5.4 Math 3 Fall 2006, Bauerle

1. 3 2. 3 3. 2 4. c 5. c 6. a 7. c 8. e 9. c 10. b 11. d 12. d 13. e