

Math Xb—Spring 2004
Properties of Logarithms

Note that $\log x = \log_{10} x$ and $\exp(x) = e^x$.

1. Find the expression that is equivalent to

$$\log x + \log x^2 - 3 \log x.$$

(a) $\log(x^3 + x - 3)$

(b) 0

(c) $\log\left(\frac{x^3}{3}\right)$

(d) $\log\left(\frac{x^2 + x}{3x}\right)$

(e) 1

2. Find the expression that is equivalent to

$$\log_2 u^2 v.$$

(a) $\log_2 u + \log_2 v$

(b) $\log_2 2 + \log_2 u + \log_2 v$

(c) $2 \log_2 u + \log_2 v$

(d) $2 \log_2 u + 2 \log_2 v$

(e) $1 + \log_2 u + \log_2 v$

3. Find the expression that is equivalent to

$$\ln \frac{e}{\sqrt{uv}}.$$

(a) $\frac{1}{2} - \frac{1}{2} \ln u - \frac{1}{2} \ln v$

(b) $-\sqrt{\ln u} - \sqrt{\ln v}$

(c) $1 - \frac{1}{2} \ln u - \frac{1}{2} \ln v$

(d) $-\frac{1}{2} \ln u - \frac{1}{2} \ln v$

(e) $1 - \sqrt{\ln u} - \sqrt{\ln v}$

4. Find the expression that is equivalent to

$$5 \log_5 \sqrt[3]{5}.$$

- (a) $5/3$ (d) 10
(b) $3/5$ (e) 6
(c) 60

5. Find the expression that is equivalent to

$$\ln \sqrt{x} - \frac{\ln x^3}{3} - 3 \ln x.$$

- (a) $\frac{2}{7} \ln x$ (d) $\frac{7}{2} \ln x$
(b) $-\frac{2}{7} \ln x$ (e) $-\frac{7}{2} \ln x$
(c) $\frac{17}{6} \ln x$

6. Find the expression that is equivalent to

$$\log_2 3.$$

- (a) $\frac{\ln 2}{\ln 3}$ (d) $\frac{\log 2}{\log 3}$
(b) $(\ln 2)(\ln 3)$ (e) $\frac{\ln 3}{\ln 2}$
(c) $(\log 2)(\log 3)$

7. Find the expression that is equivalent to

$$\log 50.$$

- (a) $2 - \log 2$ (c) $\log 2$
(b) $\frac{1}{2} \log 100$ (d) $\log 100 + \log 2$
(e) $2 + \log 2$

8. Find the expression that is equivalent to

$$5 \log \left(\frac{2}{3} \right).$$

(a) $\log 10 - \log 15$

(b) $5 \log 2 - 5 \log 3$

(c) $\log 15 - \log 10$

(d) $5 \log 3 - 5 \log 2$

(e) $5 \log 3 + 5 \log 2$

9. Find the expression that is equivalent to

$$\log_2 \left(\frac{7}{5} \right).$$

(a) $\frac{\ln 5 - \ln 2}{\ln 7}$

(b) $\frac{\ln 2 - \ln 5}{\ln 7}$

(c) $\frac{\ln 7 - \ln 5}{\ln 2}$

(d) $\frac{\ln 5 - \ln 7}{\ln 2}$

(e) $\frac{\ln 2 - \ln 7}{\ln 5}$

10. Find the expression that is equivalent to

$$\log_7 5x.$$

(a) $\frac{\ln 7 + \ln x}{\ln 5}$

(b) $\frac{\ln 5 + \ln x}{\log_7 5}$

(c) $\frac{\ln 5 + \ln x}{\log_5 7}$

(d) $\frac{\ln 5 + \ln x}{\ln 7}$

(e) $\frac{\ln 7 + \ln 5}{\ln x}$

Answers

1. b

3. c

5. e

7. a

9. c

2. c

4. a

6. e

8. b

10. d