

1. Express $\frac{1}{2} \log a - \log b - \log c$ as a single logarithm.

A. $\log\left(\frac{\sqrt{a}}{bc}\right)$

B. $\log\left(\frac{c\sqrt{a}}{b}\right)$

C. $\log\left(\frac{1}{2} a - b - c\right)$

D. $\log\left(\frac{a}{2bc}\right)$

2. If $\log_5 x = 4.26$, what is the value of $\log_5 25x^2$?

A. 2.66

B. 3.80

C. 8.26

D. 10.52

3. Determine an expression for x , if $\log x = \log a - 2 \log b + \frac{1}{4} \log c$.

A. $\frac{a}{b^2 \sqrt[4]{c}}$

B. $\frac{a \sqrt[4]{c}}{b^2}$

C. $\frac{a}{c^4 \sqrt{b}}$

D. $\frac{ac^4}{\sqrt{b}}$

4. If $a = b^{c \log_b d}$, then which of the following **must** be true?

A. $a = cd$

B. $a = b^c$

C. $a = d^c$

D. $a = dc$

5. Solve: $5^{x+1} = 9$ (Accurate to 3 decimal places.)

A. 0.268

B. 0.255

C. 0.365

D. 2.365

Solve: $7^{2\log_7 x + \log_7 x} = 27$

6.

- A. 2
- B. 3
- C. 5
- D. 7

7. Write as a single logarithm: $3\log b - \log 2 - \log c$

A. $\log\left(\frac{b^3}{2c}\right)$

B. $\log\left(\frac{3b}{2c}\right)$

C. $\log\left(\frac{b^3c}{2}\right)$

D. $\log(3b - 2 - c)$

8. Simplify: $\log_a(\sqrt{a})^x$

A. $\frac{x}{2}$

B. $\left(\frac{1}{2}\right)^x$

C. x^2

D. $\sqrt{x}$

9. Given that $y_1 = \log_a 5$ and $y_2 = \log_a 3$ where $0 < a < 1$, which of the following **must** be true?

A. $y_1 > 5$

B. $y_1 < y_2$

C. $y_1 > y_2$

D. $3 < y_2 < 5$

10. Solve for x : $3^x = \frac{1}{20}$ (Accurate to 2 decimal places.)

A. -0.44

B. -2.73

C. 0.44

D. 2.73

11. If $\log x = a$ and $\log y = b$, express $\log\left(\frac{10x^2}{y^2}\right)$ in terms of a and b .

A. $1 + a^2 - b^2$

B. $1 + 2a - 2b$

C. $10 + a^2 - b^2$

D. $10 + 2a - 2b$

12. Write as a single logarithm: $2 \log a + 3 \log a^2$

A. $\log a^7$

B. $\log a^8$

C. $\log a^{10}$

D. $\log a^{12}$

13. Determine an expression for $\log 45$ if $\log 5 = a$ and $\log 3 = b$.

A. $a + b^2$

B. $a + 2b$

C. $2a + 2b$

D. $3a + 3b$

* 14. Solve for x : $a^{3x} = b^{2x+1}$

A. 1

B. $\log\left(\frac{1}{a^3b}\right)$

C. $\frac{\log b}{3 \log a - 2}$

D. $\frac{\log b}{3 \log a - 2 \log b}$

15. Express $2 + 3 \log a - \log b$ as a single logarithm.

A. $\log\left(\frac{100a^3}{b}\right)$

B. $\log(100a^3 - b)$

C. $\log\left(\frac{2a^3}{b}\right)$

D. $\log(2a^3 - b)$

16. Simplify: $\log_b(b\sqrt{b})$

A. $\frac{1}{2}$

B. $\frac{3}{2}$

C. $b^{\frac{1}{2}}$

D. $b^{\frac{3}{2}}$

8.4

17. If $\log x = a$, write $\log\left(\frac{1}{x^2}\right)$ in terms of a .

- A. $-a^2$
- B. $-2a$
- C. $1-a^2$
- D. $1-2a$

18. Simplify: $\log_a x^{\log_x b}$

- A. $\frac{b}{a}$
- B. a^b
- C. $\log_a b$
- D. $b \log a$

19. Which expression is equivalent to $3 \log a + \log b - \frac{1}{2} \log c$?

- A. $\log\left(\frac{6ab}{c}\right)$
- B. $\log\left(\frac{a^3b}{\sqrt{c}}\right)$
- C. $\log\left(3a + b - \frac{1}{2}c\right)$
- D. $\log\left(\frac{a^3 + b}{\sqrt{c}}\right)$

20. Which expression is equivalent to $\log \frac{a^2}{bc}$?

- A. $2 \log a - \log b + \log c$
- B. $2 \log a - \log b - \log c$
- C. $\log 2 + \log a - \log b - \log c$
- D. $\frac{2 \log a}{\log b + \log c}$

21. If $\log_a n = 16$, find $\log_a \sqrt{n}$.

- A. 4
- B. 8
- C. 32
- D. 256

22. Simplify: $a^{\log_a 12 - \log_a 4}$

- A. 3
- B. 8
- C. a^3
- D. a^8

23. Simplify: $\left(\frac{a}{b}\right)^{\log \frac{1}{2}} \left(\frac{a}{b}\right)^{\log \frac{1}{3}}$

- A. $\frac{b}{a}$
- B. $\frac{a}{b}$
- C. $\frac{1}{ab}$
- D. $\left(\frac{a}{b}\right)^7$

24. If $\log_a b = 0.5$, evaluate $\log_a \sqrt{b} + \log_a \left(\frac{a}{b}\right)$.

- A. 0.5
- B. 0.75
- C. 1
- D. 1.5

25. Which expression is equivalent to $\log_2 8x$?

- A. $3 \log_2 x$
- B. $3 + \log_2 x$
- C. $4 + \log_2 x$
- D. $3 + 3 \log_2 x$

26. If $\log_9 4 = x$ and $\log_3 7 = y$, express $\log_3 28$ in terms of x and y .

- A. xy
- B. $2xy$
- C. $x + y$
- D. $2x + y$

27. Which expression is equivalent to $2 \log \frac{3}{x}$?

- A. $\log 9 - 2 \log x$
- B. $\log 9 - \log x$
- C. $\log 6 - \log 2x$
- D. $(\log 3 - \log x)^2$

28. Which expression is equivalent to $\log \left(\frac{b}{c}\right)$?

- A. $\log b + \log c$
- B. $\log b - \log c$
- C. $(\log b)(\log c)$
- D. $\frac{\log b}{\log c}$

29. Simplify: $5^{(2\log_5 m - \log_5 n)}$

A. $\frac{m^2}{n}$

B. $m^2 - n$

C. $5^{\frac{m^2}{n}}$

D. 5^{m^2-n}

30. Which of the following is equivalent to $\log\left(\frac{a^3}{\sqrt{b}}\right)$?

A. $3\log a - \frac{1}{2}\log b$

B. $\frac{3\log a}{\frac{1}{2}\log b}$

C. $\log 3a - \log \frac{1}{2}b$

D. $\frac{\log 3a}{\log \frac{1}{2}b}$

31. If $\log_3 7 = x$ and $\log_2 9 = y$, determine an expression for $\log_9 7 + \log_2 3$ in terms of x and y .

A. $\frac{1}{2}x + \frac{1}{2}y$

B. $2x + \frac{1}{2}y$

C. $\frac{1}{2}x + \sqrt{y}$

D. $2x + \sqrt{y}$

32. If $\log a = x$ and $\log b = y$, express $\log\left(\frac{a^2}{\sqrt{b}}\right)$ in terms of x and y .

A. $2x - \frac{y}{2}$

B. $2y - \frac{x}{2}$

C. $x^2 - \sqrt{y}$

D. $\frac{x^2}{\sqrt{y}}$

KEY

1. A

6. B

11. B

16. B

21. B

26. D

31. A

2. D

7. A

12. B

17. B

22. A

27. A

32. A

3. B

8. A

13. B

18. C

23. A

28. B

4. C

9. B

14. D

19. B

24. B

29. A

5. C

10. B

15. A

20. B

25. B

30. A