

Rewrite each equation in exponential form.

1) $\log_n m = -15$

2) $\log_x 41 = -1$

Rewrite each equation in logarithmic form.

3) $x^7 = y$

4) $y^x = 164$

You may use a calculator to evaluate each expression. Round each answer to 2 decimal places where necessary.

5) $\log_{64} \frac{1}{2}$

6) $\log_6 216$

7) $\log_5 54$

8) $\log_3 7$

Expand each logarithm.

9) $\log_9 \left(\frac{a^4}{b} \right)^6$

10) $\log_5 \frac{a^5}{b^3}$

11) $\log_6 (u^3 v^5)$

12) $\log_6 (uv^5)^5$

Condense each expression to a single logarithm.

13) $5\log_3 x + 2\log_3 y$

14) $3\log_3 a - 2\log_3 b$

15) $9\log_3 x - 3\log_3 y$

16) $\log_2 a + \log_2 b + 2\log_2 c$

Solve each equation.

17) $4^{2x-2} = 4^{1-x}$

18) $5^{-3x-2} = 5^{-x}$

19) $16^{3x} = 64^{3-2x}$

20) $64^{x-3} = 16^{-2x}$

21) $8^x = 60$

22) $2^x = 49$

23) $2 \cdot 5^{x+2} = 33$

24) $7^{10x} + 9 = 33$

25) $\log_4(3x+6) = \log_4(-5x+9)$

26) $\log_5(x+9) = \log_5 -2x$

$$27) \log_7 2 - \log_7 x = \log_7 42$$

$$28) \log_6 4 - \log_6 x = \log_6 28$$

$$29) \log_3 x - \log_3 10 = 1$$

$$30) \log_7 6 - \log_7 x = 2$$

$$31) \log_9 (x - 9) + \log_9 4 = \log_9 44$$

$$32) \log_5 -3x + \log_5 2 = 2$$

$$33) \log_6 -2x - \log_6 5 = \log_6 37$$

$$34) \log_7 6 - \log_7 (x - 1) = 2$$

$$35) \log_{11} x = 3$$

$$36) \log_{12} x = 4$$

$$37) \log_9 -8x - 7 = -7$$

$$38) -2\log_4 8x = 2$$

Round your answer to the nearest cent value.

- 39) Jenny invests \$7,115 in a retirement account with a fixed annual interest rate of 2.73% compounded 4 times per year. What will the account balance be after 20 years?
- 40) John invests \$4,993 in a savings account with a fixed annual interest rate of 2% compounded 4 times per year. What will the account balance be after 11 years?

Round your answer to the nearest whole year.

- 41) Alberto invests \$3,898 in a retirement account with a fixed annual interest rate of 7.89% compounded 4 times per year. How long will it take for the account balance to reach \$18,598.90?
- 42) Gabriella invests \$1,213 in a savings account with a fixed annual interest rate of 4% compounded 12 times per year. How long will it take for the account balance to reach \$1,882.06?