

## PRACTICE: Exponential and Logarithmic Functions NO CALCULATORS

1. Solve each of the following for  $x$ .

a)  $\log_2 \frac{1}{256} = x$

b)  $\log_x 32 = -5$

c)  $\log_5 \sqrt[3]{5} = x$

d)  $\log_4 512 = x$

e)  $\log_x 36 = -2$

f)  $\log_x \sqrt{\frac{4}{9}} = \frac{1}{2}$

2. Solve each of the following for  $x$ .

a)  $\left(\frac{2}{3}\right)^{x-1} + \left(\frac{2}{3}\right)^x = \frac{20}{27}$

b)  $2^{x+2} - 2^x = 96$

c)  $4^{x-1} + 4^{x-3} = 272$

d)  $\left(\frac{1}{2}\right)^{x-2} - \left(\frac{1}{2}\right)^x = \frac{3}{32}$

3. Solve each equation for  $x$ .

a)  $\log_2(4x - 3) = \log_2\left(\frac{1}{2}x + 2\right)$

b)  $\log_3(3x) = \log_3(8x - 10)$

c)  $\log_4\left(-\frac{4}{5}x\right) = \log_4\left(-x - \frac{9}{5}\right)$

d)  $\log(11 - x) = \log(1 - 2x)$

4. Solve each equation for  $x$ .

a)  $\log x + \log x^2 = 3$

b)  $\log_4 x^2 - \log_4 x = 2$

c)  $\log_{12} x^3 - \log_{12} x^5 = -2$

d)  $\log_3 x^4 + \log_3 x = 5$

5. Solve each of the following for  $x$ .

a)  $\log_6(x + 1) + \log_6(x + 2) = 1$

b)  $\log_7(x + 2) + \log_7(x - 4) = 1$

c)  $\log_2(x + 2) = 3 - \log_2 x$

d)  $\log_4 x + \log_4(x + 6) = 2$

e)  $\log_5(2x + 2) - \log_5(x - 1) = \log_5(x + 1)$

f)  $9^{x+1} = 27^{2x}$

6. Solve each of the following for  $x$ .

a)  $\log_5 x = 3$

b)  $\log_4 x = 2$

c)  $\log_x 27 = 3$

d)  $\log_4\left(\frac{1}{64}\right) = x$

e)  $\log_x\left(\frac{1}{9}\right) = 2$

f)  $\log_{\frac{1}{4}} x = -2$

7. Evaluate.

a)  $\log_2 16^{-2}$

b)  $2^{\log_2 20}$

c)  $\log_3 \frac{1}{27}$

d)  $\log_6 72 - \log_6 2$

e)  $\log_3 0.9 + \log_3 10$

f)  $\log_6 216^5$

### Answers

- |    |                   |                  |                  |        |                  |                  |
|----|-------------------|------------------|------------------|--------|------------------|------------------|
| 1. | a) -8             | b) $\frac{1}{2}$ | c) $\frac{1}{3}$ | d) 4.5 | e) $\frac{1}{6}$ | f) $\frac{4}{9}$ |
| 2. | a) 3              | b) 5             | c) 5             | d) 5   |                  |                  |
| 3. | a) $\frac{10}{7}$ | b) 2             | c) -9            | d) -10 |                  |                  |
| 4. | a) 10             | b) 16            | c) 12            | d) 3   |                  |                  |
| 5. | a) 1              | b) 5             | c) 2             | d) 2   | e) 3             | f) $\frac{1}{2}$ |
| 6. | a) 125            | b) 16            | c) 3             | d) -3  | e) $\frac{1}{3}$ | f) 16            |
| 7. | a) -8             | b) 20            | c) -3            | d) 2   | e) 2             | f) 15            |