

Practice Problems 1

Express as a logarithm.

1. $4^3 = 64$

2. $8^{\frac{2}{3}} = 4$

3. $125^{\frac{4}{3}} = 625$

Express with exponents.

4. $\log_9 27 = 1.5$

5. $\log_{10} .0001 = -4$

6. $\log_{11} 1,331 = 3$

Solve for x.

7. $\log_7 343 = x$

8. $\log_{1,000} 100 = x$

9. $\log_6 \frac{1}{36} = x$

Get the mantissa from the table: .8451

Use the exponent for the characteristic: 3

$$\log 7,000 = 3.8451 \quad \therefore 10^{3.8451} = 7,000$$

Practice Problems 2

Solve for x . You may round the mantissa to two places if you wish.

1. $\log 400 = x$
2. $\log 80 = x$
3. $\log 6,000,000 = x$
4. $\log 30,000 = x$

Practice Problems 3

Use the table to solve for x . (Find the antilog.)

1. $\log x = 4.7782$

2. $\log x = 2.6990$

3. $\log x = 5.8451$

4. $\log x = 7.9542$

Check your answers by entering the logarithm into your calculator and pressing the key for antilog. You should get a number close to the value of x you got by using the table.

For numbers on the other side of the decimal system (less than 1), there is a little twist because there are two ways to express them. In the past, before calculators, decimal numbers were always expressed with a positive characteristic and mantissa. This was done by adding 10 to a negative mantissa, and then subtracting 10 from the characteristic. Study the example to see how this works.

Example 16

Recall that $(3^2)^5 = 3^{2 \times 5} = 3^{10}$. When you raise a power to a power, you multiply the exponents.

$$175^6 =$$

$$\log(175^6) = (\log 175) \text{ times } 6 \text{ or } 6 \log 175$$

$$6 \log 175 = 6(2.243) = 13.458$$

$$\text{or } 6(2) + 6(.243) = 12 + 1.458 = 13.458$$

$$\text{antilog } 13.458 = 28,710,000,000,000.$$

Check with Y^{X} key or $175 \times 175 \times 175 \times 175 \times 175 \times 175$.

$$175 \text{Y}^{\text{X}} 6 = 2.87229^{13}, \text{ which means } 2.87229 \text{ times } 10^{13}.$$

When this is multiplied and expanded, it is 28,722,900,000,000.

Example 17

Solve using logs with both methods. $(.05)^3 =$

Using negative logs and the calculator both give the same result.

$$3 \log (.05) = 3(-1.301) = -3.903$$

The antilog of -3.903 is $.000125$.

Practice Problems 4

Solve with logarithms, and check your answers with a calculator.

1. $7,194 \times 382 =$

2. $846,300 \times 1,227 =$

3. $5.148 \div 687 =$

4. $59.6 \div .008 =$

5. $19^4 =$

6. $(.7)^5 =$