

Algebra 2
5.7 Investigation – Properties of Logarithms

Name: answer
Period: _____

Log Form	Decimal Form
log 2	0.301
log 3	0.477
log 5	0.699
log 6	0.778
log 8	0.903
log 9	0.954

Log Form	Decimal Form
log 10	1.000
log 12	1.079
log 15	1.176
log 16	1.204
log 25	1.398
log 27	1.431

Step 1: Look for pairs of logarithm values in the table whose sum is a third value in the table.

- a. $\log 2 + \log 3 = \underline{0.778}$ Where can you find that value in the table? log 6
- b. $\log 2 + \log 5 = \underline{1}$ Where can you find that value in the table? log 10
- c. $\log \underline{2} + \log \underline{6} = \log \underline{12}$ d. $\log \underline{3} + \log \underline{5} = \log \underline{15}$
- e. $\log \underline{3} + \log \underline{9} = \log \underline{27}$ f. $\log \underline{5} + \log \underline{5} = \log \underline{25}$

Complete the conjecture:

$$\log a + \log b = \log \underline{ab}$$

Step 2: Write each of the following as the sum of two logs. Use your calculator to check your answers.

- a. $\log 90 = \log \underline{9} + \log \underline{10}$ b. $\log 30 = \log \underline{15} + \log \underline{2}$ c. $\log 72 = \log \underline{8} + \log \underline{9}$

Step 3: Now find pairs of values in the table whose difference is another value in the table.

- a. $\log 15 - \log 3 = \log \underline{5}$ b. $\log 6 - \log 2 = \log \underline{3}$ c. $\log \underline{25} - \log \underline{5} = \log \underline{5}$
- d. $\log \underline{27} - \log \underline{9} = \log \underline{3}$ e. $\log \underline{10} - \log \underline{5} = \log \underline{2}$ f. $\log \underline{9} - \log \underline{3} = \log \underline{3}$

Complete the conjecture:

$$\log a - \log b = \log \underline{a/b}$$

Step 4: Now find values in the table that can be multiplied by an integer to give another value in the table.

- a. $3 \log 2 = \log \underline{8}$ b. $2 \log 3 = \log \underline{9}$ c. $4 \log 2 = \log \underline{16}$
- d. $\underline{3} \log \underline{3} = \log \underline{27}$ e. $\underline{2} \log \underline{5} = \log \underline{25}$ f. $\underline{\quad} \log \underline{\quad} = \log \underline{\quad}$

Complete the conjecture:

$$b \log a = \log a^b$$