What is a Logarithm?

Worksheet

The logarithm log_b(x) = y means b^y = x - the exponent y that the base b must be raised to in order to produce x. For example log_2(8) = 3 because 2 = 8.

log_a(x) = y @Leftrightarrow a^y = x

Questions

1. log_2(16) equals:

A) 2
B) 4
C) 8
D) 16

2. log_10(100) equals:

A) 1
B) 2
C) 10
D) 100

3. log_b(1) is always:

A) 1
B) b
C) 0
D) undefined

4. log_b(mn) equals:

A) log_b(m) log_b(n)
B) log_b(m) + log_b(n)
C) log_b(m) log_b(n)
D) log_b(m)/log_b(n)

5. Find log_2(8).

6. Find log_10(1000).

7. Solve for x: log_3(x) = 4.

8. Define: What does log_b(x) = y mean?

9. Define: What is log_10 called?

10. Define: What is ln?

Answer Key

1. B) 4 - 2 = 16, so log_2(16) = 4.
2. B) 2 - 10 = 100, so log_10(100) = 2.
3. C) 0 - Any base to the power 0 equals 1, so log_b(1) = 0.
4. B) log_b(m) + log_b(n) - The product rule: log_b(mn) = log_b(m) + log_b(n).
5. log_2(8) = y means 2^y = 8 2 = 8, so y = 3
6. log_10(1000) = y means 10^y = 1000 10 = 1000, so y = 3
7. log_3(x) = 4 means 3 = x 3 = 81, so x = 81
8. b^y = x - the exponent that raises base b to give x.
9. The common logarithm.
10. The natural logarithm, log base e (e 2.718).