

A.P. Statistics: Review of Logarithms and Their Properties

Recall that a *logarithm* is merely an *exponent*. By definition,

$$\log_b x = y \text{ if and only if } b^y = x$$

The Properties or Laws of Logarithms are:

1. $\log(AB) = \log A + \log B$
2. $\log(A/B) = \log A - \log B$
3. $\log X^p = p \cdot \log X$

Rewrite the following in logarithm form.

1. $4^3 = 64$

2. $3^4 = 81$

Rewrite the following in exponential form.

3. $\log_2 16 = 4$

4. $\log_6 216 = 3$

Evaluate the following logarithms without using a calculator.

5. $\log_{10} 1000$

6. $\log_2 32$

7. $\log_{25} 5$

Express the following in terms of logarithms of x , y and z .

8. $\log\left(\frac{xy}{z}\right)$

9. $\log(x^2 yz)$

10. $\log\left(\frac{x}{yz}\right)$

11. $\log\left(\frac{y^3}{\sqrt{z}}\right)$

Write each expression as a single logarithm.

12. $\log x - \log y + \log z$

13. $2\log x - 3\log y$

14. $\log x + 2\log y - 5\log z$

15. $\log 3x + 3\log(2y)$

Solve each equation using logarithms (recall that $\log = \log_{10}$).

16. $\log 10 - \log 2 = \log(x - 1)$

17. $\log(2x + 3) = \log 11 + \log 3$