

Problem

If b and y are positive real numbers such that $\log_b y = 2$, what is $\log_{b^2}(y)$? Why?

Step-by-step solution

Step 1 of 1

Assume that, b and y are positive real numbers such that,

$$\log_b y = 2.$$

$$\log_b y = 2$$

$$b^2 = y \text{ By the definition of logarithm}$$

Squaring on both sides, obtained as,

$$(b^2)^2 = y^2$$

Take, \log_{b^2} on both sides, obtained as,

$$\log_{b^2} (b^2)^2 = \log_{b^2} y^2$$

$$2 \log_{b^2} (b^2) = \log_{b^2} y^2$$

$$\log_{(b^2)} y^2 = 2$$

$$2 \log_{(b^2)} y = 2$$

Therefore,

$$\boxed{\log_{(b^2)} y = 1.}$$

Because, by the definition of logarithm, it can be derived that,

If $\log_b x = n$, then,

$$\log_{b^n} x = 1.$$