= bx . Because f takes arbitrarily large and arbitrarily small positive values , any number y > 0 lies between f (x0) and f (x1) for suitable x0 and x1 . Hence , the intermediate value theorem ensures that the equation f (x) =
y has a solution . Moreover , there is only one solution to this equation , because the function f is strictly increasing (for b > 1) , or strictly decreasing (for 0 < b < 1) .
The unique solution x is the logarithm of y to base b , logb (y) . The function that assigns to y its logarithm is called logarithm function or logarithmic function (or just logarithm) .
The function logb (x) is essentially characterized by the above product formula
<formula>
More precisely , the logarithm to any base b > 1 is the only increasing function f from the positive reals to the reals satisfying f (b) = 1 and
<formula>

= = = Inverse function = = =

The formula for the logarithm of a power says in particular that for any number x ,
<formula>
In prose , taking the x @-@ th power of b and then the base @-@ b logarithm gives back x . Conversely , given a positive number y , the formula
<formula>