Question #37867, Math, Algebra

logx-log3=1 solve for x

Solution

We have

$$\log x - \log 3 = 1$$

Using the quotient rule we rewrite the equation in the form

$$\log\frac{x}{3} = 1.$$

Now we must convert the equation to exponential form. We are dealing with the common logarithm here and so the base is 10.

Here is the exponential form of this equation

$$\frac{x}{3} = 10^1.$$

This is an equation that we can easily solve and x =30 is a potential solution. Now we need to substitute this in the original equation and see if it will produce negative numbers or zeroes in the logarithm. If it does it can't be a solution and if it doesn't then it is a solution.

$$\log 30 - \log 3 = 1,$$

$$\log\frac{30}{3} = 1,$$

$$\log 10 = 1.$$

Only positive numbers are in the logarithm and so x = 30 is in fact a solution.

Answer

x = 30.