

7.5 Day 2: Logarithmic Equations

A **logarithmic equation** is an equation that includes one or more logarithms involving a variable.

Exponential Form:

Logarithmic Form:

Remember... $b^x = y \longleftrightarrow \log_b y = x$

Ex. Write in exponential form. Then solve.

$$\log x = 2$$

$$10^2 = x$$

$$100 = x$$

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Ex. What is the solution of $\log_{10}(4x - 3) = 2$?

$$10^2 = 4x - 3$$

$$103 = 4x$$

$$25.75 = x$$

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Using Properties of Logs to solve equations:

Ex. What is the solution of $\log(x-3) + \log x = 1$?

$$\log(x-3) \cdot x = 1$$

$$\log_{10}(x^2 - 3x) = 1$$

$$\begin{array}{r} 10^1 = x^2 - 3x \\ \underline{-10} \qquad \qquad \underline{-10} \end{array}$$

$$0 = x^2 - 3x - 10$$

$$0 = (x-5)(x+2)$$

$$\boxed{x=5, x=-2}$$

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Ex. What is the solution of $\log 6 - \log 3x = -2$?

$$\log \frac{6}{3x} = -2$$

$$\log_{10} \frac{2}{x} = -2$$

$$10^{-2} = \frac{2}{x}$$

$$\frac{1}{100} = \frac{2}{x}$$

$$\boxed{x=200}$$

Feb 28-10:00 AM

Last one!

Ex. $4 \log_4 2 - 2 \log_4 x = 1$

$$\log_4 16 - \log_4 x^2 = 1$$

$$\log_4 \frac{16}{x^2} = 1$$

$$4^1 = \frac{16}{x^2}$$

$$\frac{4}{1} = \frac{16}{x^2}$$

$$4x^2 = 16$$

$$\sqrt{x^2} = \sqrt{4}$$

$$x = \pm 2$$

Feb 28-10:01 AM

Homework:

P. 473:

#': 33-45 odds, 65-75 odds, and 79-82 all

Feb 28-10:03 AM