

3.5 Solving Logarithmic Equations Lesson

This document was composed and formatted by Annie Bernatchez.

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Part 1: Try and Solve a Logarithmic Equation

Solve the equation $\log(x + 5) = 2\log(x - 1)$

Hint: apply the power law of logarithms to the right side of the equation

Note: If $\log_m a = \log_m b$, then $a = b$.

Part 2: Solve Simple Logarithmic Equations

Reminder: to complete this lesson, you will need to remember how to change from logarithmic to exponential form:

$$y = \log_b x \rightarrow x = b^y$$

Example 2: Solve each of the following equations

a) $\log(x + 4) = 1$

Method 1: re-write in exponential form

Method 2: express both sides as a logarithm of the same base

b) $\log_5(2x - 3) = 2$

Part 3: Apply Factoring Strategies to Solve Equations

Example 3: Solve each equation and reject any extraneous roots

a) $\log(x - 1) - 1 = -\log(x + 2)$

b) $\log \sqrt[3]{x^2 + 48x} = \frac{2}{3}$

c) $\log_3 x - \log_3(x - 4) = 2$

Example 4: If $\log_a b = 3$, then use log rules to find the value of...

a) $\log_a ab^2$

b) $\log_b a$

Hint: need to change the base: $\log_b m = \frac{\log_a m}{\log_a b}$