Sec 8-5: Exponential and Logarithmic Equations

You can solve Logarithmic Equations using the following basic steps:

-Move all logarithmic terms to one side of the equation and all other terms to the other side.

-Combine all logarithms into a single logarithm using the properties of logarithms.

-Change to an exponential equation.

-Solve

Solve.

$2\log_5 x - 9 = 15$

$+9 \quad +9$

$\frac{2\log_5 x}{2} = \frac{24}{2}$

$\log_5 x = 12$

$5^{12} = x$

Solve.

$\log_2 (x-3)^2 = 8$

$2^8 = (x-3)^2$

$\sqrt{256} = \sqrt{(x-3)^2}$

$\pm 16 = x - 3 \longrightarrow x = 16+3 = 19 \quad -16+3 = -13$

$-13, 19 = x$ these are both solutions

Solve.

$\log 4x + \log x = 2$

$\log 4x \cdot x = 2$

$\log 4x^2 = 2$

$10^2 = 4x^2$

$\sqrt{100} = \sqrt{4x^2}$

$\frac{\pm 10}{2} = \frac{2x}{2}$

$x = \pm 5$

$x = 5$

- 5 is an extraneous solution