B.5 - Day 1 - Solving Logarithmic Equations

Day 1 Objective: 1. Solve logarithmic equations by converting into exponential form.

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

Remember from last unit!?!?

Logarithmic Form: ⟷ Exponential Form:

$\log_b m = n$ $\qquad$ $b^n = m$

May 1-12:14 PM

Ex.1 Convert these logarithmic equations into exponential equations, then solve for x.

$\log_2 x = 5$

$2^5 = x$

$32 = x$

$\log_x 81 = 2$

$x^2 = 81$

$\sqrt{x^2} = \sqrt{81}$ OR $x^2 - 81 = 0$

$x = \pm 9$

$(x+9)(x-9) = 0$

$x = \pm 9$

May 1-12:29 PM

Ex.2 Convert these logarithmic equations into exponential equations, then solve for x.

$\log_{10}(3x-8)=2$

$10^2 = 3x-8$

$100 = 3x-8$

$108 = 3x$

$36 = x$

$\log_2(x^2+2x)=3$

$2^3 = x^2+2x$

$8 = x^2+2x$

$-8 \quad -8$

$0 = x^2+2x-8$

$0 = (x-2)(x+4)$

$x=2 \quad x=-4$

May 1-12:29 PM

Ex.3 Convert these logarithmic equations into exponential equations, then solve for x.

$\log_{(x-6)}4=2$

$(x-6)^2 = 4$

$(x-6)(x-6) = 4$ FOIL

$x^2-12x+36 = 4$

$-4 \quad -4$

$x^2-12x+32 = 0$

$(x-8)(x-4) = 0$

$x=8 \quad x=4$

$\log_{(x+5)}(4x+17)=2$

$(x+5)^2 = 4x+17$

$(x+5)(x+5) = 4x+17$ FOIL

$x^2+10x+25 = 4x+17$

$-4x \quad -17 \quad -4x \quad -17$

$x^2+6x+8 = 0$

$(x+2)(x+4) = 0$

$x=-2,-4$

May 1-12:39 PM