

## 5.6 Exponential and Logarithmic Equations

In this section we will look at how to solve equations involving logarithms or exponents.

EXAMPLE: Solve:  $\log_4(x+2) = 3$

EXAMPLE: Solve:  $\log_5(4x+5) = 2$

EXAMPLE: Solve:  $\log_{11}(x-12) = \log_{11} 2$

EXAMPLE: Solve:  $2 \cdot \log_7 x = \log_7 16$

EXAMPLE: Solve:  $\log_5 x + \log_5 (4x - 1) = 1$

EXAMPLE: Solve:  $\log_2 (x + 11) + \log_2 (x + 7) = 5$

EXAMPLE: Solve:  $\log_8(x+7) = 1 - \log_8(2-x)$

EXAMPLE: Solve:  $\log_2(x+3) - \log_2(x+5) = 1$

EXAMPLE: Solve:  $\log_3(x+1) = 2 + \log_3(2x-1)$

EXAMPLE: Solve:  $\log_2(x-3) + \log_2 x - \log_2(x+2) = 2$

**Equal Bases Property** (The Equivalence Property of Exponential Expressions)

If  $a^u = a^v$  then  $u = v$ .

EXAMPLE: Solve:  $4^{x-2} = 64$ .

EXAMPLE: Solve:  $6^{2x-7} - 216 = 0$ .

EXAMPLE: Solve:  $27^{x+2} = 9^{2x}$ .

EXAMPLE: Solve:  $7^{y^3} = 49^y$ .

EXAMPLE: Solve:  $(2^x)^{x-2} = 8$ .

EXAMPLE: Solve:  $3^x = 7$ .

EXAMPLE: Solve:  $e^{x+5} = 4$ .

EXAMPLE: Solve:  $2^{x+1} = 5^{1-2x}$ .

EXAMPLE: Solve:  $3^{2x} - 3^x - 72 = 0$ .

EXAMPLE: Solve:  $2^{2x} - 7 \cdot 2^x + 12 = 0$ .