Section 6.6

Logarithmic and Exponential Equations

OBJECTIVE 1

1. Solve Logarithmic Equations

Recall:

$$y = \log_a x \quad \text{is equivalent to} \quad x = a^y \qquad a > 0, a \neq 1$$

If $\log_a M = \log_a N$, then $M = N$

M, N, and a are positive and $a \neq 1$

EXAMPLE Solving a Logarithmic Equation

Solve: $\log_3 4 = 2\log_3 x$

EXAMPLE Solving a Logarithmic Equation

Solve: $\log_2(x+2)+\log_2(1-x)=1$

EXAMPLE Solving a Logarithmic Equation

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

OBJECTIVE 2

2 Solve Exponential Equations

Recall:

If $a^u = a^v$, then $u = v$ $\quad a > 0, a \neq 1$

EXAMPLE Solving an Exponential Equation

Solve: $3^x = 7$

EXAMPLE Solving an Exponential Equation

Solve: $5 \cdot 2^x = 3$

EXAMPLE Solving an Exponential Equation

Solve: $2^{x-1} = 5^{2x+3}$

EXAMPLE

Solving an Exponential Equation That Is Quadratic in Form

Solve: $9^x - 3^x - 6 = 0$

OBJECTIVE 3

3 Solve Logarithmic and Exponential Equations Using a Graphing Utility

EXAMPLE

Solving Equations Using a Graphing Utility

Solve $2x - e^{2x} = 4$