# Math 150 Lecture Notes
# Exponential and Logarithmic Equations

**To Solve an Exponential Equation:**

1. Isolate the exponential expression on one side of the equation.
2. Change from exponential to logarithmic form.
3. Use the Laws of Logarithms to solve for the variable.

**To Solve a Logarithmic Equation:**

1. Use the Laws of Logarithms to combine (condense) the logarithms into one term
2. Change from logarithmic to exponential form.
3. Solve the resulting equation for the variable.

Example 1: Find the solution of each exponential equation, correct to four decimal places.

$2^{3x} = 34$ $\qquad$ $e^{3-5x} = 16$ $\qquad$ $\dfrac{10}{1+e^{-x}} = 2$

Example 2: Solve the equation.

$x^2e^x + xe^x - e^x = 0$

Example 3: Solve each logarithmic equation for $x$.

$\ln(2 + x) = 1$ $\log(x - 4) = 3$

Example 4: Solve each logarithmic equation for $x$.

$2 \log x = \log 2 + \log(3x - 4)$ $\log_5 x + \log_5 (x + 1) = \log_5 20$