10 – Solving Exponential & Logarithmic Equations

> **Strategy: Solving exponential and logarithmic equations**
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> - If the variable appears in an exponent, try to isolate the exponential containing the variable, and then apply a logarithm to both sides of the resulting equation.
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> - If the variable appears in a logarithm, try to isolate the logarithm containing the variable, and then apply an exponential to both sides of the resulting equation.

1. Solve each of the following for x.

   (a) $6^{2x} = 100$

   (b) $2^{-3x+1} - 16 = 0$

   (c) $3^{6x+5} = 5^{2x}$

2. Solve each of the following for x.

   (a) $2\ln(3x) - 4 = 0$

   (b) $\log_3(x+8) + \log_3(x) = 2$

3. Suppose that you invest $8000 at a yearly interest rate of 3.5%. Suppose the interest is compounded annually. Let $A(t)$ be the amount of money after t years.

   (a) Write a formula for $A(t)$.

   (b) Determine when your investment will have doubled.

4. A $10,000 inheritance is invested for 15 years with interest that is compounded quarterly. At the end of 15 years, the inheritance has grown to $22,100. What was the interest rate?

5. Solve for y in the equation $e^{2y} - 5e^y - 6 = 0$.