

**Solving Exponential Equations with Logarithms**  
**Module 2, Unit 4, Lesson 7**

**Solving Exponential Equations**

1. Express both sides in the same base
  - a. Rewrite the equation in the form  $b^M = b^N$
  - b. Set  $M = N$
  - c. Solve for the variable.
  
2. Use common logarithms or natural logarithms
  - a. Isolate the exponential expression
  - b. Take the common logarithm or natural logarithm of both sides
  - c. Simplify using properties of exponents.
  - d. Solve for the variable

**Examples:** Solve.

a.  $2^{3x-8} = 16$

b.  $e^{2x} = 5$

c.  $3^{3x-6} = \frac{1}{27}$

d.  $e^{x+4} = \frac{1}{e^{2x}}$

e.  $5^{4-x} = 7^{3x+1}$

f.  $2e^{x+2} - 3 = 5$

g.  $6^{x+2} = 12$

h.  $25^{4-x} = 5^{3x}$

i.  $3^{2x-3} = 2^{x+4}$

j.  $e^{1-x} - 4 = 10$

k.  $3^x = 7^{-3x+2}$

l.  $3 \cdot 2^{5x} = 216$

m.  $2^{x-3} = 10$

n.  $5^{2x-3} = 6^{x-1}$