Pre-Calculus 12
Solving Exponential Equations

Review Exponent Laws

$x^n \cdot x^m =$ $\dfrac{x^n}{x^m} =$ $(x^n)^m =$

$\left(\dfrac{x}{y}\right)^n =$ $x^0 =$ $x^{-n} =$

$x^{n/m} =$

Steps to solve an exponential equation:

1. If the bases are the same (one base on each side) use one-to-one property;
    - ➢ equate the exponents and solve

    If $b^m = b^n$, then $m = n$

2. If bases are different;
    - ➢ rewrite with the same base
    - ➢ equate the exponents and solve

Ex. 1) Solve for x.

a) $2^{5x-1} = 16$

b) $4^{x+2} = 64^x$

c) $3^x(27) = 81^{2x+1}$

d) $2^{3x} \cdot 4^{x-1} = \left(\frac{1}{8}\right)^{x+2}$

e) $4^{x+1} = 2^x\sqrt{2}$

f) $\left(\frac{1}{2}\right)^{-x^2} = 8^{2x-3}$

To solve for a missing base, raise both sides of the equation to the reciprocal power of the given exponent.

Ex. 2) Solve.

a.) $b^4 = 16$

b.) $b^{\frac{2}{3}} = 9$