

EXPONENTIAL EQUATIONS

$x^2 = 4$  is not an exponential equation

$2^x = 4$  is " " " "

Solve  $2^x = 4$

$$2^{\textcircled{x}} = 2^{\textcircled{2}}$$

$$x = 2$$

$$b^x = b^y \Rightarrow x = y$$

Solve:  $2^x = 3$  this equation needs logarithm

Ex: Solve

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

$$3^{\textcircled{x-1}} = \frac{1}{3^{\textcircled{3}}} = 3^{-3}$$

$$x-1 = -3$$

$$x = -3 + 1 = -2$$

Ex:

$$(e^{x^2})^2 \cdot \frac{1}{(e^x)^3} \cdot \frac{1}{e^9} = 1$$

$$e^{2x^2} \cdot \frac{1}{e^{3x}} \cdot \frac{1}{e^9} = e^0$$

$$e^{2x^2} \cdot e^{-3x} \cdot e^{-9} = e^0$$

$$e^{2x^2-3x-9} = e^0$$

$$2x^2 - 3x - 9 = 0$$

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

$$x^{-n} = \frac{1}{x^n}$$

$$x^n \cdot x^m = x^{n+m}$$

$$(2x+3)(x-3) = 0$$

$$\begin{array}{l|l|l} 0 = a \cdot c = -18 & -6, 3 & \\ + = b = -3 & -3 & \end{array}$$

$$2x^2 - 3x - 9 = \underline{2x^2 - 6x} + \underline{3x - 9}$$

$$= 2x(x-3) + 3(x-3)$$

$$= (x-3)(2x+3) = 0$$

$$x-3=0$$

$$\boxed{x=3}$$

$$\text{or } 2x+3=0$$

$$2x = -3$$

$$\boxed{x = -3/2}$$