• General Method for Solving Equations

In general to solve exp. equations of any base, we isolate the exp. term, when possible, and take logarithms of both sides using either base 10 or e.

EX: Solve $3(4^{0.2x}) = 2$. Write solution(s) in exact form and to 3 decimals.

$$4^{0.2x} = \frac{2}{3}$$

$$\log 4^{0.2} = \log\left(\frac{2}{3}\right)$$

$$\frac{0.2x \log 4}{0.2 \log 4} = \frac{\log\left(\frac{2}{3}\right)}{0.2 \log 4}$$

$$x = \frac{\log\left(\frac{2}{3}\right)}{0.2 \log 4} \quad \text{(exact)}$$

$$x = -1.462 \quad \text{(approx.)}$$

EX: Solve $3^{2x} - 3^x - 6 = 0$.

Let $u = 3^x$

$$u^2 = (3^x)^2 = 3^{2x}$$

$$\Rightarrow u^2 - u - 6 = 0$$

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

$u - 3 = 0$ OR $u + 2 = 0$

$u = 3$ $\quad$ $u = -2$

$\Rightarrow 3^x = 3$ $\quad$ $3^x = -2$

$x = 1$ $\quad$ not possible

Sol. Set = $\{1\}$