Equations Reducible To Quadratics

e.g. $(i)\ x^4 - 4x^2 - 12 = 0$

let $m = x^2$

$m^2 = x^4$

$m^2 - 4m - 12 = 0$

$(m-6)(m+2) = 0$

$m = 6 \quad \text{or} \quad m = -2$

$x^2 = 6 \quad \text{or} \quad x^2 = -2$

$x = \pm\sqrt{6} \qquad \text{no real solutions}$

$\therefore x = \pm\sqrt{6}$

$(ii)\ 9^x - 4\left(3^x\right) + 3 = 0$

let $m = 3^x$

$m^2 = \left(3^x\right)^2 = 3^{2x} = \left(3^2\right)^x = 9^x$

$m^2 - 4m + 3 = 0$

$(m-3)(m-1) = 0$

$m = 3 \quad \text{or} \quad m = 1$

$3^x = 3 \quad \text{or} \quad 3^x = 1$

$\therefore x = 1 \quad \text{or} \quad x = 0$

Exercise 8D; 1, 2ad, 3b, 4ab, 5ac, 6a, 8ab*i*, 9a*