

5. By finding a suitable substitution, solve each of the following:

(iii)  $x^4 - 2x^2 - 2 = 0$

(iv)  $2(k-2)^2 - 3(k-2) - 4 = 0$

method 1 expand

Simplify

Solve

$$X = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$\begin{aligned} a &= 2 \\ b &= -11 \\ c &= 10 \end{aligned}$$

$$\begin{aligned} 2(k-2)^2 - 3(k-2) - 4 &= 0 \\ 2[k^2 - 4k + 4] - 3k + 6 - 4 &= 0 \\ 2k^2 - 8k + 8 - 3k + 2 &= 0 \\ 2k^2 - 11k + 10 &= 0 \end{aligned}$$

$$k = \frac{-(-11) \pm \sqrt{(-11)^2 - 4(2)(10)}}{2(2)}$$

$$= \frac{+11 \pm \sqrt{41}}{4}$$

method 2

let  $k-2 = x$

① Solve for x

$$a=2, b=-3, c=-4$$

② Solve for k

$$\begin{aligned} k-2 &= x \\ k &= x+2 \end{aligned}$$

$$\begin{aligned} 2(k-2)^2 - 3(k-2) - 4 &= 0 \\ \Rightarrow 2x^2 - 3x - 4 &= 0 \end{aligned}$$

$$x = \frac{-(-3) \pm \sqrt{(-3)^2 - 4(2)(-4)}}{2(2)}$$

$$x = \frac{3 \pm \sqrt{41}}{4}$$

$$k = \frac{3 \pm \sqrt{41}}{4} + 2 = \frac{11 \pm \sqrt{41}}{4}$$