

## COMPLETE SQUARE (VERTEX FORM) OF A QUADRATIC EQUATION

$$\begin{array}{c} x \quad -3 \\ \times \quad \begin{array}{|c|c|} \hline x^2 & -3x \\ \hline -3 & +9 \\ \hline \end{array} \end{array}$$

Express  $x^2 - 6x - 12 = 0$  in the form  $(x-p)^2 + q = 0$ .  
Hence solve for  $x$ .

$$x^2 - 6x + 9 - 9 - 12 = 0$$

$$(x-3)^2 - 21 = 0$$

Hence solve

$$(x-3)^2 = 21$$

$$x-3 = \pm\sqrt{21}$$

$$x = 3 \pm \sqrt{21}$$

$$\begin{array}{c} x \quad -\frac{11}{2} \\ \times \quad \begin{array}{|c|c|} \hline x^2 & -\frac{11}{2}x \\ \hline -\frac{11}{2} & +\frac{121}{4} \\ \hline \end{array} \end{array}$$

Express  $-x^2 + 11x + 15 = 0$  in the form  $q - (x-p)^2 = 0$  and hence solve.

$$-[x^2 - 11x - 15] = 0$$

$$-\left[\left(x - \frac{11}{2}\right)^2 - \frac{121}{4} - 15\right] = 0$$

$$-\left[\left(x - \frac{11}{2}\right)^2 - \frac{181}{4}\right] = 0$$

$$\frac{181}{4} - \left(x - \frac{11}{2}\right)^2 = 0$$

Hence:  $\frac{181}{4} = \left(x - \frac{11}{2}\right)^2$

$$\pm\sqrt{\frac{181}{4}} = x - \frac{11}{2}$$

$$x = \frac{11}{2} \pm \sqrt{\frac{181}{4}}$$