

Sec. 10.4 Solving Equations of the Form $x^2 + bx + c = 0$

Solve by completing the square.

a. $x^2 + 2x = 3$

$$x^2 + 2x + 1 = 3 + 1$$

$$(x+1)^2 = 4$$

$$\sqrt{(x+1)^2} = \pm \sqrt{4}$$

$$x+1 = \pm 2$$

$$\begin{array}{r} -1 \quad -1 \\ \hline x = -1 \pm 2 \end{array} \left\{ \begin{array}{l} -1+2 = 1 \\ -1-2 = -3 \end{array} \right.$$

Find the zeros. $\rightarrow y=0$

a. $y = x^2 - 4x + 1$

$$0 = x^2 - 4x + 1$$

$$-1 + 4 = x^2 - 4x + 4$$

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

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

$$\pm\sqrt{3} = x-2$$

$$+2 \quad +2$$

$$\boxed{2 \pm \sqrt{3} = x}$$

c. Let: $y = x^2 - 6x + 12$.

Find the value(s) of x when y is 4.

$$\begin{array}{r} 4 = x^2 - 6x + 12 \\ -4 \qquad \qquad \qquad -4 \end{array}$$

$$0 = x^2 - 6x + 8$$

Factor

$\frac{8}{1.8}$
 2.4

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

$$\begin{array}{r} x-2=0 \quad x-4=0 \\ +2 \quad +2 \quad +4 \quad +4 \\ \hline x=2 \quad x=4 \end{array}$$

CTS

$$x^2 - 6x + 8 = 0$$

$$x^2 - 6x + 9 = -8 + 9$$

$$(x-3)^2 = 1$$

$$\sqrt{(x-3)^2} = \pm \sqrt{1}$$

$$x-3 = \pm 1$$

$$+3 \quad +3$$

$$x = 3 \pm 1 \quad \left\{ \begin{array}{l} 3+1=4 \\ 3-1=2 \end{array} \right.$$

d. Find the points where the graphs of $y = x^2 - 4x + 11$ and $y = x + 5$ intersect.

Substitution

$$y = 2 + 5$$

$$y = 7$$

$$(2, 7)$$

$$y = 3 + 5$$

$$y = 8$$

$$(3, 8)$$

$$\begin{array}{r} |x + 5 = x^2 - 4x + 11 \\ -|x - 5 \quad \quad \quad -|x - 5 \\ \hline \end{array}$$

$$0 = x^2 - 5x + 6$$

same sign
+6 sign

1.6

$$\boxed{-2 \cdot 3}$$

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

$$x - 2 = 0$$

$$\begin{array}{r} +2 \quad +2 \\ \hline \end{array}$$

$$\boxed{x = 2}$$

$$x - 3 = 0$$

$$\begin{array}{r} +3 \quad +3 \\ \hline \end{array}$$

$$\boxed{x = 3}$$

Solve using the method indicated.

$$\begin{aligned}
 \text{a. } x^2 - 4x - 60 &= 0 \\
 x^2 - 4x + 4 &= 60 + 4 \\
 (x-2)^2 &= 64 \\
 \sqrt{(x-2)^2} &= \pm\sqrt{64}
 \end{aligned}$$

$$\begin{array}{l}
 \text{CTS} \\
 \frac{x-2 = \pm 8}{+2 \quad +2} \\
 \hline
 x = 2+8 = 10 \\
 \quad 2-8 = -6
 \end{array}$$

$$\begin{aligned}
 \text{b. } x^2 - 5x + 4 &= 0 \\
 (x-1)(x-4) &= 0 \quad x=1, 4
 \end{aligned}$$

$$\begin{aligned}
 \text{c. } y &= 7x - 35 \\
 y &= x^2 - 3x - 10
 \end{aligned}$$

$$\text{p. } 502 (19-49) \text{ eoo}$$