1. Check whether the following are quadratic equations:

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

(ii) $x – 2x = (- 2) (3-x)$

(iii) $(x – 2) (x + 1) = (x – 1) (x + 3)$

(iv) $(x – 3) (2x + 1) = x (x + 5)$

(v) $(2x – 1) (x – 3) = (x + 5) (x – 1)$

(vi) $x^2 + 3x + 1 = (x – 2)^2$

(vii) $(x + 2)^3 = 2x(x^2 – 1)$

(viii) $x^3 -4x^2 -x + 1 = (x-2)^3$

Solution:

(i) Given: $(x+ 1)^2=2(x-3)$

$\Rightarrow x^2 + 1 + 2x = 2x – 6$

$\Rightarrow x^2 + 1 + 2x – 2x + 1 = 0$

$\Rightarrow x^2 + 7 = 0$

As the highest power of x is 2, so the given equation is **quadratic.**

(ii) Given: $x^2 – 2x = (- 2) (3 -x)$

$\Rightarrow x^2 -2x = -6 + 2x$

$\Rightarrow x^2 -4x + 6 = 0$

As the highest power of x is 2, so the given equation is **quadratic.**

(iii) Given: $(x – 2) (x + 1) = (x – 1) (x + 3)$

$\Rightarrow x^2 – 2x + x – 2 = x^2 – x + 3x – 3$

$\Rightarrow x^2 – x – 2 = x^2 + 2x – 3$

$\Rightarrow 3x – 1 = 0$

As the highest power of x is 2, so the given equation is **quadratic.**

(iv) Given: $(x-3) (2x+ 1) = x (x + 5)$

$\Rightarrow 2x^2 – 6x + x – 3 = x^2 + 5x$

$\Rightarrow x^2 – 10x -3 = 0$

As the highest power of x is 2, so the given equation is **quadratic.**

(v) Given: (2x-1)(x-3) = (x + 5)(x-1)

$\Rightarrow 2x^2 - 6x - x + 3 = x^2 + 5x - x - 5$

$\Rightarrow x^2 - 11x + 8 = 0$

As the highest power of x is 2, so the given equation is **quadratic.**.

(vi) Given: $x^2 + 3x + 1 = (x - 2)^2$

$\Rightarrow x^2 + 3x + 1 = x^2 + 4 - 4x$

$\Rightarrow 7x - 3 = 0$

As the highest power of x is 1, so the given equation is **not quadratic.**

(vii) Given: $(x + 2)^3 = 2x (x^2 - 1)$

$\Rightarrow x^3 + 8 + 6x^2 + 12x = 2x^3 - 2x$

$\Rightarrow x^3 - 6x^2 - 14x - 8 = 0$

As the highest power of x is 1, so the given equation is **not quadratic.**

(viii) Given $x^3 - 4x^2 - x+1 = (x - 2)^3$

$\Rightarrow x^3 - 4x^2 -x + 1 = x^3 - 6x^2 + 12x - 8$

$\Rightarrow 2x^2 - 13x + 9 = 0$

As the highest power of x is 1, so the given equation is **quadratic.**