



## Quadratic Equations Ex 8.1 Q1

**Answer :**

We are given the following algebraic expressions and are asked to find out which one is quadratic.

(i) Here it has been given that,

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

Now, the above equation clearly represents a quadratic equation of the form  $ax^2 + bx + c = 0$ , where  $a = 1$ ,  $b = 6$  and  $c = -4$ .

Hence, the above equation is a quadratic equation.

(ii) Here it has been given that,

$$\sqrt{3}x^2 - 2x + \frac{1}{2} = 0$$

Now, solving the above equation further we get,

$$\frac{2\sqrt{3}x^2 - 4x + 1}{2} = 0$$

$$2\sqrt{3}x^2 - 4x + 1 = 0$$

Now, the above equation clearly represents a quadratic equation of the form  $ax^2 + bx + c = 0$ , where  $a = 2\sqrt{3}$ ,  $b = -4$  and  $c = 1$ .

Hence, the above equation is a quadratic equation.

(iii) Here it has been given that,

$$x^2 + \frac{1}{x^2} = 5$$

Now, solving the above equation further we get,

$$\frac{x^4 + 1}{x^2} = 0$$

$$x^4 + 1 = 0$$

Now, the above equation clearly does not represent a quadratic equation of the form  $ax^2 + bx + c = 0$ , because  $x^4 + 1$  is a polynomial of degree 4.

Hence, the above equation is not a quadratic equation.

(iv) Here it has been given that,

$$x - \frac{3}{x} = x^2$$

Now, solving the above equation further we get,

$$\frac{x^2 - 3}{x} = x^2$$

$$x^2 - 3 = x^3$$

$$-x^3 + x^2 - 3 = 0$$

Now, the above equation clearly does not represent a quadratic equation of the form  $ax^2 + bx + c = 0$ , because  $-x^3 + x^2 - 3$  is a polynomial of degree 3.

Hence, the above equation is not a quadratic equation.

(v) Here it has been given that,

$$2x^2 - \sqrt{3}x + 9 = 0$$

Now, the above equation clearly does not represent a quadratic equation of the form  $ax^2 + bx + c = 0$ ,

because  $2x^2 - \sqrt{3}x + 9 = 0$  contains a term  $x^{\frac{1}{2}}$ , where  $\frac{1}{2}$  is not an integer.

Hence, the above equation is not a quadratic equation.

(vi) Here it has been given that,

$$x^2 - 2x - \sqrt{x} - 5 = 0$$

Now, as we can see the above equation clearly does not represent a quadratic equation of the form

$ax^2 + bx + c = 0$ , because  $x^2 - 2x - \sqrt{x} - 5 = 0$  contains an extra term  $x^{\frac{1}{2}}$ , where  $\frac{1}{2}$  is not an integer.

Hence, the above equation is not a quadratic equation.

(vii) Here it has been given that,

$$3x^2 - 5x + 9 = x^2 - 7x + 3$$

Now, after solving the above equation further we get,

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

$$x^2 + x + 3 = 0$$

Now as we can see, the above equation clearly represents a quadratic equation of the form

$ax^2 + bx + c = 0$ , where  $a = 1$ ,  $b = 1$  and  $c = 3$ .

Hence, the above equation is a quadratic equation.

(viii) Here it has been given that,

$$x + \frac{1}{x} = 1$$

Now, solving the above equation further we get,

$$\frac{x^2 + 1}{x} = 1$$

$$x^2 + 1 = x$$

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

Now as we can see, the above equation clearly represents a quadratic equation of the form

$$ax^2 + bx + c = 0, \text{ where } a = 1, b = -1 \text{ and } c = 1.$$

Hence, the above equation is a quadratic equation.

(ix) Here it has been given that,

$$x^2 - 3x = 0$$

Now as we can see, the above equation clearly represents a quadratic equation of the form

$$ax^2 + bx + c = 0, \text{ where } a = 1, b = -3 \text{ and } c = 0.$$

Hence, the above equation is a quadratic equation.

(x) Here it has been given that,

$$\left(x + \frac{1}{x}\right)^2 = 3\left(x + \frac{1}{x}\right) + 4$$

Now, solving the above equation further we get,

$$\left(\frac{x^2 + 1}{x}\right)^2 = \frac{3x^2 + 1 + 4x}{x}$$

$$x^4 + 1 + 2x^2 = 3x^3 + x + 4x^2$$

$$x^4 - 3x^3 - 2x^2 - x + 1 = 0$$

Now as we can see, the above equation clearly does not represent a quadratic equation of the form

$$ax^2 + bx + c = 0, \text{ because } x^4 - 3x^3 - 2x^2 - x + 1 \text{ is a polynomial having a degree of 4 which is never present in a quadratic polynomial.}$$

Hence, the above equation is not a quadratic equation.

(xi) Here it has been given that,

$$(2x + 1)(3x + 2) = 6(x - 1)(x - 2)$$

Now, after solving the above equation further we get,

$$6x^2 + 7x + 2 = 6x^2 - 18x + 12$$

$$25x - 10 = 0$$

$$5x - 2 = 0$$

Now as we can see, the above equation clearly does not represent a quadratic equation of the form

$$ax^2 + bx + c = 0, \text{ because } 5x - 2 = 0 \text{ is a linear equation.}$$

Hence, the above equation is not a quadratic equation.

(xii) Here it has been given that,

$$x + \frac{1}{x} = x^2$$

Now, solving the above equation further we get,

$$\left(\frac{x^2 + 1}{x}\right) = x^2$$

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

$$-x^3 + x^2 + 1 = 0$$

Now as we can see, the above equation clearly does not represent a quadratic equation of the form

$$ax^2 + bx + c = 0, \text{ because } -x^3 + x^2 + 1 \text{ is a polynomial having a degree of 3 which is never present in a quadratic polynomial.}$$

Hence, the above equation is not a quadratic equation.

(xiii) Here it has been given that,

$$16x^2 - 3 = (2x + 5)(5x - 3)$$

Now, after solving the above equation further we get,

$$16x^2 - 3 = 10x^2 + 19x - 15$$

$$4x^2 - 19x + 12 = 0$$

Now as we can see, the above equation clearly represents a quadratic equation of the form

$$ax^2 + bx + c = 0, \text{ where } a = 4, b = -19 \text{ and } c = 12.$$

Hence, the above equation is a quadratic equation.

(xiv) Here it has been given that,

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

Now, after solving the above equation further we get,

$$x^3 + 8 + 3(x)(2)(x + 2) = x^3 - 4$$

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

$$x^2 + 2x + 2 = 0$$

Now as we can see, the above equation clearly represents a quadratic equation of the form

$$ax^2 + bx + c = 0, \text{ where } a = 1, b = 2 \text{ and } c = 2.$$

Hence, the above equation is a quadratic equation.

(xv) Here it has been given that,

$$x(x+1)+8=(x+2)(x-2)$$

Now, solving the above equation further we get,

$$x^2+x+8=x^2-4$$

$$x+12=0$$

Now as we can see, the above equation clearly does not represent a quadratic equation of the form

$ax^2+bx+c=0$ , because  $x+12=0$  is a linear equation which does not have a  $x^2$  term in it.

Hence, the above equation is not a quadratic equation.

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