

## Exercise 5(D)

(i)  $x^2 - 6x = 27$

**Solution:**Given equation,  $x^2 - 6x = 27$ 

$x^2 - 6x - 27 = 0$

Here,  $a = 1$ ,  $b = -6$  and  $c = -27$ 

By quadratic formula, we have

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

$$x = \frac{-(-6) \pm \sqrt{(-6)^2 - 4(1)(-27)}}{2(1)}$$

$$x = \frac{6 \pm \sqrt{36 - -108}}{2}$$

$$x = \frac{6 \pm \sqrt{144}}{2}$$

$$x = \frac{6 \pm 12}{2}$$

$$x = \frac{18}{2} \quad x = -\frac{6}{2}$$

$$x = 9$$

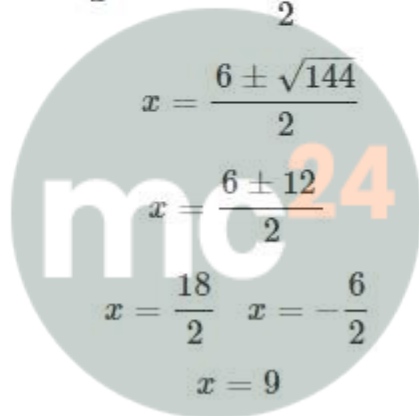
$$x = -3$$

Therefore,  $x = 9$  or  $-3$ 

(ii)  $x^2 - 10x + 21 = 0$

**Solution:**Given equation,  $x^2 - 10x + 21 = 0$ Here,  $a = 1$ ,  $b = -10$  and  $c = 21$ 

By quadratic formula, we have



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

$$x = \frac{-(-10) \pm \sqrt{(-10)^2 - 4(1)(21)}}{2(1)}$$

$$x = \frac{10 \pm \sqrt{100 - 84}}{2}$$

$$x = \frac{10 \pm \sqrt{16}}{2}$$

$$x = \frac{10 \pm 4}{2}$$

$$x = \frac{14}{2} \quad x = \frac{6}{2}$$

$$x = 7 \quad x = 3$$

Therefore,  $x = 7$  or  $x = 3$

**(iii)  $x^2 + 6x - 10 = 0$**

**Solution:**

Given equation,  $x^2 + 6x - 10 = 0$

Here,  $a = 1$ ,  $b = 6$  and  $c = -10$

By quadratic formula, we have

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

$$x = \frac{-6 \pm \sqrt{6^2 - 4(1)(-10)}}{2(1)}$$

$$x = \frac{-6 \pm \sqrt{36 - -40}}{2}$$

$$x = \frac{-6 \pm \sqrt{76}}{2}$$

$$x = \frac{-6 \pm 2\sqrt{19}}{2}$$

$$x = \frac{-6}{2} \pm \frac{2\sqrt{19}}{2}$$

$$x = -3 \pm \sqrt{19}$$

Therefore,  $x = -3 + \sqrt{19}$  or  $x = -3 - \sqrt{19}$

(iv)  $x^2 + 2x - 6 = 0$

**Solution:**

Given equation,  $x^2 + 2x - 6 = 0$

Here,  $a = 1$ ,  $b = 2$  and  $c = -6$

By quadratic formula, we have

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

$$x = \frac{-2 \pm \sqrt{2^2 - 4(1)(-6)}}{2(1)}$$

$$x = \frac{-2 \pm \sqrt{4 - -24}}{2}$$

$$x = \frac{-2 \pm \sqrt{28}}{2}$$

$$x = \frac{-2 \pm 2\sqrt{7}}{2}$$

$$x = \frac{-2}{2} \pm \frac{2\sqrt{7}}{2}$$

$$x = -1 \pm \sqrt{7}$$

Therefore,  $x = -1 + \sqrt{7}$  or  $x = -1 - \sqrt{7}$

(v)  $3x^2 + 2x - 1 = 0$

**Solution:**

Given equation,  $3x^2 + 2x - 1 = 0$

Here,  $a = 3$ ,  $b = 2$  and  $c = -1$

By quadratic formula, we have

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

$$x = \frac{-2 \pm \sqrt{2^2 - 4(3)(-1)}}{2(3)}$$

$$x = \frac{-2 \pm \sqrt{4 - -12}}{6}$$

$$x = \frac{-2 \pm \sqrt{16}}{6}$$

$$x = \frac{-2 \pm 4}{6}$$

$$x = \frac{2}{6} \quad x = -\frac{6}{6}$$

$$x = \frac{1}{3} \quad x = -1$$

Therefore,  $x = 1/3$  or  $x = -1$

(vi)  $2x^2 + 7x + 5 = 0$

**Solution:**

Given equation,  $2x^2 + 7x + 5 = 0$

Here,  $a = 2$ ,  $b = 7$  and  $c = 5$

By quadratic formula, we have

## Chapter 5: Quadratic Equations

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

$$x = \frac{-7 \pm \sqrt{7^2 - 4(2)(5)}}{2(2)}$$

$$x = \frac{-7 \pm \sqrt{49 - 40}}{4}$$

$$x = \frac{-7 \pm \sqrt{9}}{4}$$

$$x = \frac{-7 \pm 3}{4}$$

$$x = -\frac{4}{4} \quad x = -\frac{10}{4}$$

$$x = -1 \quad x = -\frac{5}{2}$$

Therefore,  $x = -1$  or  $x = -5/2$

(vii)  $2/3 x = -1/6 x^2 - 1/3$

**Solution:**

Given equation,  $2/3 x = -1/6 x^2 - 1/3$

$$1/6 x^2 + 2/3 x + 1/3 = 0$$

Multiplying by 6 on both sides

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

Here,  $a = 1$ ,  $b = 4$  and  $c = 2$

By quadratic formula, we have

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

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

$$x = \frac{-4 \pm \sqrt{16 - 8}}{2}$$

$$x = \frac{-4 \pm \sqrt{8}}{2}$$

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

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

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

Therefore,  $x = -2 + \sqrt{2}$  or  $x = -2 - \sqrt{2}$

**(viii)**  $\frac{1}{15}x^2 + \frac{5}{3} = \frac{2}{3}x$   
**Solution:**

Given equation,  $\frac{1}{15}x^2 + \frac{5}{3} = \frac{2}{3}x$

$$\frac{1}{15}x^2 - \frac{2}{3}x + \frac{5}{3} = 0$$

Multiplying by 15 on both sides

$$x^2 - 10x + 25 = 0$$

Here,  $a = 1$ ,  $b = -10$  and  $c = 25$

By quadratic formula, we have

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

$$x = \frac{-(-10) \pm \sqrt{(-10)^2 - 4(1)(25)}}{2(1)}$$

$$x = \frac{10 \pm \sqrt{100 - 100}}{2}$$

$$x = \frac{10 \pm \sqrt{0}}{2}$$

$$x = \frac{10}{2}$$

$$x = 5$$

Therefore,  $x = 5$  (equal roots)

**(ix)  $x^2 - 6 = 2\sqrt{2}x$**

**Solution:**

Given equation,  $x^2 - 6 = 2\sqrt{2}x$   
 $x^2 - 2\sqrt{2}x - 6 = 0$

Here,  $a = 1$ ,  $b = -2\sqrt{2}$  and  $c = -6$

By quadratic formula, we have

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

$$= \frac{-(-2\sqrt{2}) \pm \sqrt{(-2\sqrt{2})^2 - 4(1)(-6)}}{2(1)}$$

$$= \frac{2\sqrt{2} \pm \sqrt{32}}{2} = \frac{2\sqrt{2} \pm 4\sqrt{2}}{2} = \frac{2\sqrt{2} + 4\sqrt{2}}{2} \text{ and } \frac{2\sqrt{2} - 4\sqrt{2}}{2}$$

$$= \frac{6\sqrt{2}}{2} \text{ and } \frac{-2\sqrt{2}}{2} = 3\sqrt{2} \text{ and } -\sqrt{2}$$

Therefore,  $x = 3\sqrt{2}$  or  $x = -\sqrt{2}$

**(x)  $4/x - 3 = 5/(2x + 3)$**

**Solution:**

Given equation,  $4/x - 3 = 5/(2x + 3)$

$$(4 - 3x)/x = 5/(2x + 3)$$

On cross multiplying, we have

$$(4 - 3x)(2x + 3) = 5x$$

$$8x - 6x^2 + 12 - 9x = 5x$$

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

Dividing by 6, we get

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

Here,  $a = 1$ ,  $b = 1$  and  $c = -2$

By quadratic formula, we have

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

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

$$x = \frac{-1 \pm \sqrt{1 - -8}}{2}$$

$$x = \frac{-1 \pm \sqrt{9}}{2}$$

$$x = \frac{-1 \pm 3}{2}$$

$$x = \frac{2}{2} \quad x = -\frac{4}{2}$$

$$x = 1$$

$$x = -2$$

Therefore,  $x = 1$  or  $x = -2$

**(xi)  $2x + 3/x + 3 = x + 4/x + 2$**

**Solution:**

Given equation,  $2x + 3/x + 3 = x + 4/x + 2$

On cross-multiplying, we have

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

$$2x^2 + 4x + 3x + 6 = x^2 + 3x + 4x + 12$$

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

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

Here,  $a = 1$ ,  $b = 0$  and  $c = -6$

By quadratic formula, we have



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

$$x = \frac{0 \pm \sqrt{0^2 - 4(1)(-6)}}{2(1)}$$

$$x = \frac{0 \pm \sqrt{0 - -24}}{2}$$

$$x = \frac{0 \pm \sqrt{24}}{2}$$

$$x = \frac{0 \pm 2\sqrt{6}}{2}$$

$$x = \frac{0}{2} \pm \frac{2\sqrt{6}}{2}$$

$$x = 0 \pm \sqrt{6}$$

Therefore,  $x = \sqrt{6}$  or  $x = -\sqrt{6}$

(xii)  $\sqrt{6}x^2 - 4x - 2\sqrt{6} = 0$

**Solution:**

Given equation,  $\sqrt{6}x^2 - 4x - 2\sqrt{6} = 0$

Here,  $a = \sqrt{6}$ ,  $b = -4$  and  $c = -2\sqrt{6}$

By quadratic formula, we have

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

$$= \frac{-(-4) \pm \sqrt{(-4)^2 - 4(\sqrt{6})(-2\sqrt{6})}}{2(\sqrt{6})}$$

$$= \frac{4 \pm \sqrt{64}}{2\sqrt{6}} = \frac{4 \pm 8}{2\sqrt{6}} = \frac{4+8}{2\sqrt{6}} \text{ and } \frac{4-8}{2\sqrt{6}}$$

$$= \frac{6}{\sqrt{6}} \text{ and } \frac{-2}{\sqrt{6}} = \sqrt{6} \text{ and } \frac{-\sqrt{6}}{3}$$

Therefore,  $x = \sqrt{6}$  or  $-\sqrt{6}/3$

(xiii)  $2x/x - 4 + (2x - 5)/(x - 3) = 8\frac{1}{3}$

**Solution:**

Given equation,  $2x/x - 4 + (2x - 5)/(x - 3) = 8\frac{1}{3}$

$$\Rightarrow \frac{2x(x-3) + (x-4)(2x-5)}{(x-4)(x-3)} = \frac{25}{3}$$

$$\Rightarrow \frac{2x^2 - 6x + 2x^2 - 5x - 8x + 20}{x^2 - 3x - 4x + 12} = \frac{25}{3}$$

$$\Rightarrow \frac{4x^2 - 19x + 20}{x^2 - 7x + 12} = \frac{25}{3}$$

$$25x^2 - 175x + 300 = 12x^2 - 57x + 60$$

$$13x^2 - 118x + 240 = 0$$

Here,  $a = 13$ ,  $b = -118$  and  $c = 240$

By quadratic formula, we have

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

$$x = \frac{-(-118) \pm \sqrt{(-118)^2 - 4(13)(240)}}{2(13)}$$

$$x = \frac{118 \pm \sqrt{13924 - 12480}}{26}$$

$$x = \frac{118 \pm \sqrt{1444}}{26}$$

$$x = \frac{118 \pm 38}{26}$$

$$x = \frac{156}{26} \quad x = \frac{80}{26}$$

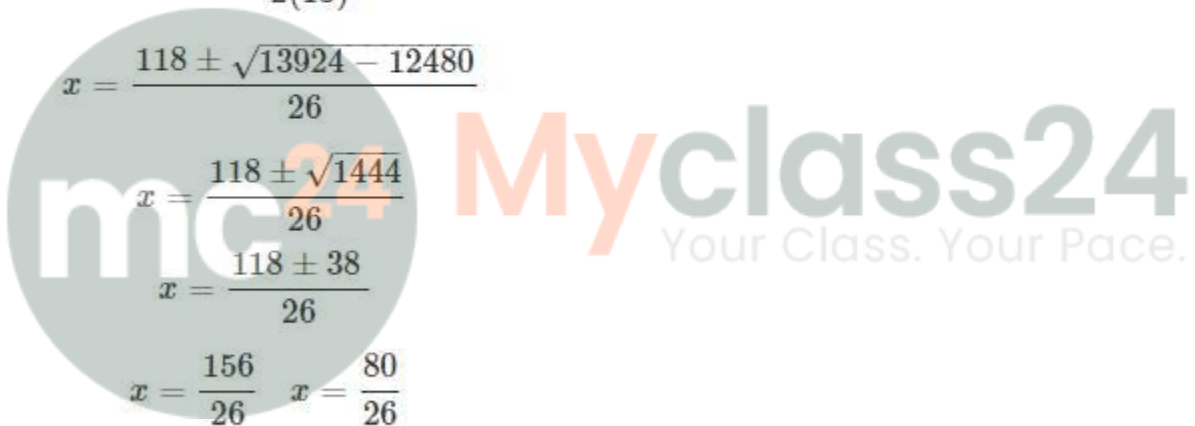
$$x = 6 \quad x = \frac{40}{13}$$

Therefore,  $x = 6$  or  $x = 40/13$

(xiv)  $\frac{x-1}{x-2} + \frac{x-3}{x-4} = 3\frac{1}{3}$

**Solution:**

From the given equation,



$$\Rightarrow \frac{(x-1)(x-4) + (x-2)(x-3)}{(x-2)(x-4)} = \frac{10}{3}$$

$$\Rightarrow \frac{x^2 - 4x - x + 4 + x^2 - 3x - 2x + 6}{x^2 - 4x - 2x + 8} = \frac{10}{3}$$

$$\Rightarrow \frac{2x^2 - 10x + 10}{x^2 - 6x + 8} = \frac{10}{3}$$

$$10x^2 - 60x + 80 = 6x^2 - 30x + 30$$

$$4x^2 - 30x + 50 = 0$$

$$2x^2 - 15x + 25 = 0$$

Here,  $a = 2$ ,  $b = -15$  and  $c = 25$

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

$$x = \frac{-(-15) \pm \sqrt{(-15)^2 - 4(2)(25)}}{2(2)}$$

$$x = \frac{15 \pm \sqrt{225 - 200}}{4}$$

$$x = \frac{15 \pm \sqrt{25}}{4}$$

$$x = \frac{15 \pm 5}{4}$$

$$x = \frac{20}{4} \quad x = \frac{10}{4}$$

$$x = 5 \quad x = \frac{5}{2}$$

Therefore,  $x = 5$  or  $x = 5/2$

**2. Solve each of the following equations for  $x$  and give, in each case, your answer correct to one decimal place:**

(i)  $x^2 - 8x + 5 = 0$

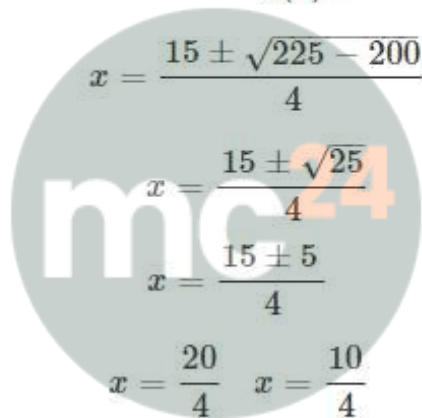
(ii)  $5x^2 + 10x - 3 = 0$

**Solution:**

(i)  $x^2 - 8x + 5 = 0$

Here,  $a = 1$ ,  $b = -8$  and  $c = 5$

By quadratic formula, we have



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

$$x = \frac{-(-8) \pm \sqrt{(-8)^2 - 4(1)(5)}}{2(1)}$$

$$x = \frac{8 \pm \sqrt{64 - 20}}{2}$$

$$x = \frac{8 \pm \sqrt{44}}{2}$$

$$x = \frac{8 \pm 2\sqrt{11}}{2}$$

$$x = \frac{8}{2} \pm \frac{2\sqrt{11}}{2}$$

$$x = 4 \pm \sqrt{11}$$

$$x = 4 \pm 3.3$$

Thus,  $x = 7.7$  or  $x = 0.7$

(ii)

$$5x^2 + 10x - 3 = 0$$

Here,  $a = 5$ ,  $b = 10$  and  $c = -3$

By quadratic formula, we have

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

$$x = \frac{-10 \pm \sqrt{10^2 - 4(5)(-3)}}{2(5)}$$

$$x = \frac{-10 \pm \sqrt{100 - -60}}{10}$$

$$x = \frac{-10 \pm \sqrt{160}}{10}$$

$$x = \frac{-10 \pm 4\sqrt{10}}{10}$$

$$x = \frac{-10}{10} \pm \frac{4\sqrt{10}}{10}$$

$$x = -1 \pm \frac{2\sqrt{10}}{5}$$

Thus,  $x = 0.3$  or  $x = -2.3$

**3. Solve each of the following equations for  $x$  and give, in each case, your answer correct to 2 decimal places:**

**(i)  $2x^2 - 10x + 5 = 0$**

**Solution:**

Given equation,  $2x^2 - 10x + 5 = 0$

Here,  $a = 2$ ,  $b = -10$  and  $c = 5$

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

$$x = \frac{-(-10) \pm \sqrt{(-10)^2 - 4(2)(5)}}{2(2)}$$

$$x = \frac{10 \pm \sqrt{100 - 40}}{4}$$

$$x = \frac{10 \pm \sqrt{60}}{4}$$

$$x = \frac{10 \pm 2\sqrt{15}}{4}$$

$$x = \frac{10}{4} \pm \frac{2\sqrt{15}}{4}$$

$$x = \frac{5}{2} \pm \frac{\sqrt{15}}{2}$$

$$x = 4.43649$$

$$x = 0.563508$$

Therefore,  $x = 4.44$  or  $x = 0.56$

**(ii)  $4x + \frac{6}{x} + 13 = 0$**

**Solution:**

Given equation,  $4x + \frac{6}{x} + 13 = 0$

Multiplying by  $x$  both sides, we get

$$4x^2 + 13x + 6 = 0$$

Here,  $a = 4$ ,  $b = 13$  and  $c = 6$

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

$$x = \frac{-13 \pm \sqrt{13^2 - 4(4)(6)}}{2(4)}$$

$$x = \frac{-13 \pm \sqrt{169 - 96}}{8}$$

$$x = \frac{-13 \pm \sqrt{73}}{8}$$

$$x = \frac{-13 \pm \sqrt{73}}{8}$$

$$x = \frac{-13}{8} \pm \frac{\sqrt{73}}{8}$$

$$x = -\frac{13}{8} \pm \frac{\sqrt{73}}{8}$$

$$x = -0.557$$

$$x = -2.693$$

Therefore,  $x = -0.56$  or  $x = -2.70$

(iii)  $4x^2 - 5x - 3 = 0$

**Solution:**

Given equation,  $4x^2 - 5x - 3 = 0$

Here,  $a = 4$ ,  $b = -5$  and  $c = -3$

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

$$x = \frac{-(-5) \pm \sqrt{(-5)^2 - 4(4)(-3)}}{2(4)}$$

$$x = \frac{5 \pm \sqrt{25 - -48}}{8}$$

$$x = \frac{5 \pm \sqrt{73}}{8}$$

$$x = \frac{5 \pm \sqrt{73}}{8}$$

$$x = \frac{5}{8} \pm \frac{\sqrt{73}}{8}$$

$$x = 1.693$$

$$x = -0.443$$

Therefore,  $x = 1.70$  or  $x = -0.44$

(iv)  $x^2 - 3x - 9 = 0$

**Solution:**

Given equation,  $x^2 - 3x - 9 = 0$

Here,  $a = 1$ ,  $b = -3$  and  $c = -9$

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

$$x = \frac{-(-3) \pm \sqrt{(-3)^2 - 4(1)(-9)}}{2(1)}$$

$$x = \frac{3 \pm \sqrt{9 - -36}}{2}$$

$$x = \frac{3 \pm \sqrt{45}}{2}$$

$$x = \frac{3 \pm 3\sqrt{5}}{2}$$

$$x = \frac{3}{2} \pm \frac{3\sqrt{5}}{2}$$

$$x = 4.8541$$

$$x = -1.8541$$

Therefore,  $x = 4.85$  or  $x = -1.85$

(v)  $x^2 - 5x - 10 = 0$

**Solution:**

Given equation,  $x^2 - 5x - 10 = 0$

Here,  $a = 1$ ,  $b = -5$  and  $c = -10$

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

$$x = \frac{-(-5) \pm \sqrt{(-5)^2 - 4(1)(-10)}}{2(1)}$$

$$x = \frac{5 \pm \sqrt{25 - -40}}{2}$$

$$x = \frac{5 \pm \sqrt{65}}{2}$$

$$x = \frac{5 \pm \sqrt{65}}{2}$$

$$x = \frac{5 \pm \sqrt{65}}{2}$$

$$x = 6.53113$$

$$x = -1.53113$$

Therefore,  $x = 6.53$  or  $x = -1.53$

**4. Solve each of the following equations for x and give, in each case, your answer correct to 3 decimal places:**

(i)  $3x^2 - 12x - 1 = 0$

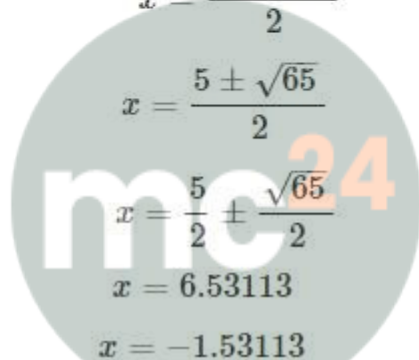
(ii)  $x^2 - 16x + 6 = 0$

(iii)  $2x^2 + 11x + 4 = 0$

**Solution:**

(i) Given equation,  $3x^2 - 12x - 1 = 0$

Here,  $a = 3$ ,  $b = -12$  and  $c = -1$



## Chapter 5: Quadratic Equations

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

$$x = \frac{-(-12) \pm \sqrt{(-12)^2 - 4(3)(-1)}}{2(3)}$$

$$x = \frac{12 \pm \sqrt{144 - -12}}{6}$$

$$x = \frac{12 \pm \sqrt{156}}{6}$$

$$x = \frac{12 \pm 2\sqrt{39}}{6}$$

$$x = \frac{12}{6} \pm \frac{2\sqrt{39}}{6}$$

$$x = 2 \pm \frac{\sqrt{39}}{3}$$

$$x = 4.08167$$

$$x = -0.081666$$

Therefore,  $x = 4.082$  or  $x = -0.082$

- (ii) Given equation,  $x^2 - 16x + 6 = 0$   
Here,  $a = 1$ ,  $b = -16$  and  $c = 6$



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

$$x = \frac{-(-16) \pm \sqrt{(-16)^2 - 4(1)(6)}}{2(1)}$$

$$x = \frac{16 \pm \sqrt{256 - 24}}{2}$$

$$x = \frac{16 \pm \sqrt{232}}{2}$$

$$x = \frac{16 \pm 2\sqrt{58}}{2}$$

$$x = \frac{16}{2} \pm \frac{2\sqrt{58}}{2}$$

$$x = 8 \pm \sqrt{58}$$

$$x = 15.6158$$

$$x = 0.384227$$

Therefore,  $x = 15.616$  or  $x = 0.384$

- (iii) Given equation,  $2x^2 + 11x + 4 = 0$   
Here,  $a = 2$ ,  $b = 11$  and  $c = 4$



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

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

$$x = \frac{-11 \pm \sqrt{121 - 32}}{4}$$

$$x = \frac{-11 \pm \sqrt{89}}{4}$$

$$x = \frac{-11 \pm \sqrt{89}}{4}$$

$$x = \frac{-11}{4} \pm \frac{\sqrt{89}}{4}$$

$$x = -\frac{11}{4} \pm \frac{\sqrt{89}}{4}$$

$$x = -0.391505$$

$$x = -5.1085$$

Therefore,  $x = -0.392$  or  $x = -5.110$

**5. Solve:**

**(i)  $x^4 - 2x^2 - 3 = 0$**

**Solution:**

Given equation,  $x^4 - 2x^2 - 3 = 0$

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

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

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

So,  $x^2 + 1 = 0$  (which is not possible) or  $x^2 - 3 = 0$

Hence,

$$x^2 - 3 = 0$$

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

**(ii)  $x^4 - 10x^2 + 9 = 0$**

**Solution:**

Given equation,  $x^4 - 10x^2 + 9 = 0$

$$x^4 - x^2 - 9x^2 + 9 = 0$$

$$x^2(x^2 - 1) - 9(x^2 - 1) = 0$$

$$(x^2 - 9)(x^2 - 1) = 0$$

So, we have

$$x^2 - 9 = 0 \text{ or } x^2 - 1 = 0$$

Hence,

$$x = \pm 3 \text{ or } x = \pm 1$$



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