

Maths 10th Unit #1



Exercise 1.1

Q#1 سیارک فارم میں مکھنیں۔ پیور دو درجی مساوات کی نشاندہی کریں

$$(i) (x+7)(x-3) = -7$$

$$x^2 - 3x + 7x - 21 = -7$$

$$x^2 + 4x - 21 + 7 = 0$$

$$x^2 + 4x - 14 = 0 \quad \text{دو درجی مساوات}$$

$$(ii) \frac{x^2+4}{3} - \frac{x}{7} = 1$$

$$\frac{7(x^2+4) - 3x}{21} = 1$$

$$7x^2 + 28 - 3x = 21$$

$$7x^2 - 3x + 28 - 21 = 0$$

$$7x^2 - 3x + 7 = 0 \quad \text{دو درجی مساوات}$$

$$(iii) \frac{x}{x+1} + \frac{x+1}{x} = 6$$

$$\frac{x^2 + (x+1)^2}{x(x+1)} = 6$$

$$x^2 + x^2 + 2x + 1 = 6(x(x+1))$$

$$2x^2 + 2x + 1 = 6x^2 + 6x$$

$$2x^2 - 6x^2 + 2x - 6x + 1 = 0$$

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

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

دو درجی مساوات ہے

$$(iv) \frac{x+4}{x-2} - \frac{x-2}{x} + 4 = 0$$

$$\frac{(x+4)(x) - (x-2)^2 + 4x(x-2)}{x(x-2)} = 0$$

$$\frac{x^2 + 4x - (x^2 + 4 - 4x) + 4x^2 - 8x}{x(x-2)} = 0$$

$$x^2 + 4x - x^2 - 4 + 4x + 4x^2 - 8x = 0$$

$$4x^2 + 8x - 8x - 4 = 0$$

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

$$x^2 - 1 = 0$$

5 پیور دو درجی مساوات ہے۔

$$(v) \frac{x+3}{x+4} - \frac{x-5}{x} = 1$$

$$\frac{x(x+3) - (x-5)(x+4)}{x(x+4)} = 1$$

$$\frac{x^2 + 3x - (x^2 + 4x - 5x - 20)}{x(x+4)} = 1$$

$$x^2 + 3x - x^2 - 4x + 5x + 20 = x(x+4)$$

$$3x - 4x + 5x + 20 = x^2 + 4x$$

$$-x^2 + 4x - 4x + 20 = 0$$

$$x^2 - 20 = 0 \quad \text{دو درجی مساوات}$$

$$(vi) \frac{x+1}{x+2} + \frac{x+2}{x+3} = \frac{25}{12}$$

$$\frac{(x+1)(x+3) + (x+2)(x+2)}{(x+2)(x+3)} = \frac{25}{12}$$

$$\frac{(x^2 + 3x + x + 3) + (x^2 + 2x + 2x + 4)}{(x+2)(x+3)} = \frac{25}{12}$$

دو درجی مساوات ہے

$$x^2 + 4x + 3 + x^2 + 4x + 4 = \frac{25}{12}(x+2)(x+3)$$

$$2x^2 + 8x + 7 = \frac{25}{12}(x^2 + 3x + 2x + 6)$$

$$12(2x^2 + 8x + 7) = 25(x^2 + 5x + 6)$$

$$24x^2 + 96x + 84 = 25x^2 + 125x + 150$$

$$24x^2 - 25x^2 + 96x - 125x + 84 - 150 = 0$$

$$-x^2 - 29x - 66 = 0$$

$$x^2 + 29x + 66 = 0 \quad \text{دو درجی مساوات ہے}$$

Q#2

بزرگہ تجزیہ حل کریں۔

$$(i) x^2 - x - 20 = 0$$

$$x^2 - 5x + 4x - 20 = 0$$

$$x(x-5) + 4(x-5) = 0$$

$$(x-5)(x+4) = 0$$

$$x-5 = 0 \quad \text{or} \quad x+4 = 0$$

$$x = 5$$

$$x = -4$$

$$S. Set = \{ -4, 5 \}$$

$$(ii) 3y^2 = y(y-5)$$

$$3y^2 = y^2 - 5y$$

$$3y^2 - y^2 + 5y = 0$$

$$2y^2 + 5y = 0$$

$$y(2y+5) = 0$$

$$y = 0 \quad \text{or} \quad 2y+5 = 0$$

$$2y = -5$$

$$y = -5/2$$

$$S. Set = \{ 0, -5/2 \}$$

$$(iii) 4 - 32x = 17x^2$$

$$0 = 17x^2 + 32x - 4$$

$$17x^2 + 32x - 4 = 0$$

$$17x^2 + 34x - 2x - 4 = 0$$

$$17x(x+2) - 2(x+2) = 0$$

$$(x+2)(17x-2) = 0$$

$$x+2 = 0 \quad \text{or} \quad 17x-2 = 0$$

$$x = -2$$

$$17x = 2$$

$$S. Set = \{ -2, 2/17 \}$$

(iv) $x^2 - 11x = 152$
 $x^2 - 11x - 152 = 0$
 $x^2 - 19x + 8x - 152 = 0$
 $x(x - 19) + 8(x - 19) = 0$
 $(x - 19)(x + 8) = 0$
 $x - 19 = 0$ or $x + 8 = 0$
 $x = 19$ or $x = -8$
 S.Set = $\{19, -8\}$

(v) $\frac{x+1}{x} + \frac{x}{x+1} = \frac{25}{12}$
 $\frac{(x+1)^2 + x^2}{x(x+1)} = \frac{25}{12}$
 $\frac{x^2 + 1 + 2x + x^2}{x^2 + x} = \frac{25}{12}$
 $\frac{2x^2 + 2x + 1}{x^2 + x} = \frac{25}{12} \Rightarrow 12(2x^2 + 2x + 1) = 25(x^2 + x)$
 $24x^2 + 24x + 12 = 25x^2 + 25x$
 $24x^2 - 25x^2 + 24x - 25x + 12 = 0$
 $-x^2 - x + 12 = 0$
 $x^2 + x - 12 = 0$
 $x^2 + 4x - 3x - 12 = 0$
 $x(x + 4) - 3(x + 4) = 0$
 $(x + 4)(x - 3) = 0$
 $x + 4 = 0$ or $x - 3 = 0$
 $x = -4$ or $x = 3$
 S.Set = $\{-4, 3\}$

(vi) $\frac{2}{x-9} = \frac{1}{x-3} - \frac{1}{x-4}$
 $\frac{2}{x-9} = \frac{(x-4) - (x-3)}{(x-3)(x-4)}$
 $\frac{2}{x-9} = \frac{x-4-x+3}{x^2-4x-3x+12}$
 $\frac{2}{x-9} = \frac{-1}{x^2-7x+12}$
 $2(x^2-7x+12) = -1(x-9)$
 $2x^2-14x+24 = -x+9$
 $2x^2-14x+x+24-9=0$
 $2x^2-13x+15=0$
 $2x^2-10x-3x+15=0$
 $2x(x-5)-3(x-5)=0$
 $(x-5)(2x-3)=0$
 $x-5=0$ or $2x-3=0$
 $x=5$ or $2x=3$
 $x=3/2$
 S.Set = $\{5, 3/2\}$

152x1
76x2
38x4
-19x8

Q#3

تکمیل مربع سے حل کریں۔

(i) $7x^2 + 2x - 1 = 0$
 $7x^2 + 2x = 1$
 $x^2 + \frac{2}{7}x = \frac{1}{7}$
 $(x)^2 + 2(x)(\frac{1}{7}) + (\frac{1}{7})^2 = \frac{1}{7} + (\frac{1}{7})^2$
 $(x + \frac{1}{7})^2 = \frac{1}{7} + \frac{1}{49}$
 $(x + \frac{1}{7})^2 = \frac{7+1}{49} = \frac{8}{49}$
 $\sqrt{(x + \frac{1}{7})^2} = \pm \sqrt{\frac{8}{49}}$
 $x + \frac{1}{7} = \pm \sqrt{\frac{2 \cdot 2 \cdot 2}{7 \cdot 7}} = \pm \frac{2\sqrt{2}}{7}$
 $x = -\frac{1}{7} \pm \frac{2\sqrt{2}}{7} = \frac{-1 \pm 2\sqrt{2}}{7}$
 S.Set = $\{\frac{-1 \pm 2\sqrt{2}}{7}\}$

تقسیم کرنے سے

اطراف کا جذر لینے سے

12x1
6x2
-4x3

(ii) $ax^2 + 4x - a = 0, a \neq 0$
 $ax^2 + 4x = a$
 $x^2 + \frac{4}{a}x = 1$
 $(x)^2 + 2(x)(\frac{2}{a}) + (\frac{2}{a})^2 = 1 + (\frac{2}{a})^2$
 $(x + \frac{2}{a})^2 = 1 + \frac{4}{a^2}$
 $= \frac{a^2 + 4}{a^2}$
 $\sqrt{(x + \frac{2}{a})^2} = \pm \sqrt{\frac{a^2 + 4}{a^2}}$
 $x + \frac{2}{a} = \pm \frac{\sqrt{a^2 + 4}}{a}$
 $x = -\frac{2}{a} \pm \frac{\sqrt{a^2 + 4}}{a}$
 $= \frac{-2 \pm \sqrt{a^2 + 4}}{a}$
 S.Set = $\{\frac{-2 \pm \sqrt{a^2 + 4}}{a}\}$

تقسیم کرنے سے

جذریں لینے سے

30x1
15x2
-10x3

(iii) $11x^2 - 34x + 3 = 0$
 $11x^2 - 34x = -3$
 $x^2 - \frac{34}{11}x = -\frac{3}{11}$
 $(x)^2 - 2(x)(\frac{17}{11}) + (\frac{17}{11})^2 = -\frac{3}{11} + (\frac{17}{11})^2$
 $(x - \frac{17}{11})^2 = -\frac{3}{11} + \frac{289}{121}$
 $(x - \frac{17}{11})^2 = \frac{-33 + 289}{121}$
 $= \frac{17}{11}$

تقسیم کرنے سے

$$(x - \frac{17}{11})^2 = \frac{256}{121}$$

$$\sqrt{(x - \frac{17}{11})^2} = \pm \sqrt{\frac{256}{121}}$$

$$x - \frac{17}{11} = \pm \frac{16}{11}$$

$$x - \frac{17}{11} = \frac{16}{11} \quad \vee \quad x - \frac{17}{11} = -\frac{16}{11}$$

$$x = \frac{16}{11} + \frac{17}{11} \quad \vee \quad x = -\frac{16}{11} + \frac{17}{11}$$

$$= \frac{16+17}{11} \quad \vee \quad = \frac{-16+17}{11}$$

$$= \frac{33}{11} \quad \vee \quad = \frac{1}{11}$$

$$= 3 \quad \vee \quad \text{S. Set} = \{3, \frac{1}{11}\}$$

(iv) $lx^2 + mx + n = 0, l \neq 0$

$$lx^2 + mx = -n$$

$$x^2 + \frac{m}{l}x = -\frac{n}{l}$$

مربع تکمیل کرنے سے

$$(x)^2 + 2(x)(\frac{m}{2l}) + (\frac{m}{2l})^2 = -\frac{n}{l} + (\frac{m}{2l})^2$$

$$(x + \frac{m}{2l})^2 = -\frac{n}{l} + \frac{m^2}{4l^2}$$

$$= \frac{-4nl + m^2}{4l^2}$$

مربع تکمیل کرنے سے

$$\sqrt{(x + \frac{m}{2l})^2} = \pm \sqrt{\frac{m^2 - 4nl}{4l^2}}$$

$$x + \frac{m}{2l} = \pm \frac{\sqrt{m^2 - 4nl}}{2l}$$

$$x = -\frac{m}{2l} \pm \frac{\sqrt{m^2 - 4nl}}{2l}$$

$$= \frac{-m \pm \sqrt{m^2 - 4nl}}{2l}$$

S. Set = $\{ \frac{-m \pm \sqrt{m^2 - 4nl}}{2l} \}$

(v) $3x^2 + 7x = 0$

$$x^2 + \frac{7}{3}x = 0$$

مربع تکمیل کرنے سے

$$(x)^2 + 2(x)(\frac{7}{6}) + (\frac{7}{6})^2 = 0 + (\frac{7}{6})^2$$

$$(x + \frac{7}{6})^2 = (\frac{7}{6})^2$$

$$\sqrt{(x + \frac{7}{6})^2} = \pm \sqrt{(\frac{7}{6})^2}$$

مربع تکمیل کرنے سے

$$x + \frac{7}{6} = \pm \frac{7}{6}$$

$$x + \frac{7}{6} = \frac{7}{6} \quad \vee \quad x + \frac{7}{6} = -\frac{7}{6}$$

$$x = \frac{7}{6} - \frac{7}{6} \quad \vee \quad x = -\frac{7}{6} - \frac{7}{6} = \frac{-7-7}{6}$$

$$= 0 \quad \vee \quad = -\frac{14}{6} = -\frac{7}{3}$$

S. Set = $\{0, -\frac{7}{3}\}$

(vi) $x^2 - 2x - 195 = 0$

$$x^2 - 2x = 195$$

$$(x)^2 - 2(x)(1) + (1)^2 = 195 + (1)^2$$

$$(x - 1)^2 = 195 + 1$$

$$(x - 1)^2 = 196$$

$$\sqrt{(x - 1)^2} = \pm \sqrt{196}$$

$$x - 1 = \pm 14$$

$$x - 1 = 14 \quad \vee \quad x - 1 = -14$$

$$x = 14 + 1 \quad \vee \quad x = -14 + 1$$

$$= 15 \quad \vee \quad = -13$$

S. Set = $\{15, -13\}$

(vii) $-x^2 + \frac{15}{2} = \frac{7}{2}x$

$$-x^2 - \frac{7}{2}x = -\frac{15}{2}$$

$$x^2 + \frac{7}{2}x = \frac{15}{2}$$

منفی ایک سے ضرب دینے سے

$$(x)^2 + 2(x)(\frac{7}{4}) + (\frac{7}{4})^2 = \frac{15}{2} + (\frac{7}{4})^2$$

$$(x + \frac{7}{4})^2 = \frac{15}{2} + \frac{49}{16}$$

$$= \frac{120 + 49}{16} = \frac{169}{16}$$

$$\sqrt{(x + \frac{7}{4})^2} = \pm \sqrt{\frac{169}{16}}$$

$$x + \frac{7}{4} = \pm \frac{13}{4}$$

$$x + \frac{7}{4} = \frac{13}{4} \quad \vee \quad x + \frac{7}{4} = -\frac{13}{4}$$

$$x = \frac{13}{4} - \frac{7}{4} \quad \vee \quad x = -\frac{13}{4} - \frac{7}{4}$$

$$= \frac{13-7}{4} \quad \vee \quad = \frac{-13-7}{4}$$

$$= \frac{6}{4} \quad \vee \quad = -\frac{20}{4}$$

$$= \frac{3}{2} \quad \vee \quad = -5$$

S. Set = $\{\frac{3}{2}, -5\}$

(viii) $x^2 + 17x + \frac{33}{4} = 0$

$$x^2 + 17x = -\frac{33}{4}$$

$$(x)^2 + 2(x)(\frac{17}{2}) + (\frac{17}{2})^2 = -\frac{33}{4} + (\frac{17}{2})^2$$

$$(x + \frac{17}{2})^2 = -\frac{33}{4} + \frac{289}{4}$$

$$= \frac{-33 + 289}{4}$$

$$= \frac{256}{4}$$

$$\sqrt{(x + \frac{17}{2})^2} = \pm \sqrt{\frac{256}{4}}$$

$$x + \frac{17}{2} = \pm \frac{16}{2}$$

$$x + \frac{17}{2} = 8 \quad \vee \quad x + \frac{17}{2} = -8$$

$$x = 8 - \frac{17}{2} \quad \vee \quad x = -8 - \frac{17}{2}$$

$$= \frac{16 - 17}{2} \quad \vee \quad = \frac{-16 - 17}{2}$$

$$= -\frac{1}{2} \quad \vee \quad = -\frac{33}{2}$$

$$\sqrt{\left(x + \frac{17}{2}\right)^2} = \pm \sqrt{\frac{256}{4}}$$

$$x + \frac{17}{2} = \pm \frac{16}{2}$$

$$x + \frac{17}{2} = \frac{16}{2} \quad \vee \quad x + \frac{17}{2} = -\frac{16}{2}$$

$$x = \frac{16}{2} - \frac{17}{2} \quad \vee \quad x = -\frac{16}{2} - \frac{17}{2}$$

$$= \frac{16-17}{2} \quad \vee \quad = \frac{-16-17}{2}$$

$$= -\frac{1}{2} \quad \vee \quad = -\frac{33}{2}$$

$$S\text{-Set} = \left\{-\frac{1}{2}, -\frac{33}{2}\right\}$$

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

$$4 = \frac{3x^2+5}{3x+1} + \frac{8}{3x+1}$$

$$4 = \frac{3x^2+5+8}{3x+1}$$

$$4(3x+1) = 3x^2+13$$

$$12x+4 = 3x^2+13$$

$$-3x^2+12x = 13-4$$

$$-3x^2+12x = 9$$

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

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

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

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

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

$$x-2 = \pm 1$$

$$x-2=1 \quad \vee \quad x-2=-1$$

$$x=1+2 \quad \vee \quad x=-1+2$$

$$=3 \quad \vee \quad =1$$

$$S\text{-Set} = \{3, 1\}$$

(x) $7(x+2a)^2 + 3a^2 = 5a(7x+23a)$

$$7(x^2+4a^2+4ax) + 3a^2 = 35ax + 115a^2$$

$$7x^2 + 28a^2 + 28ax + 3a^2 - 35ax - 115a^2 = 0$$

$$7x^2 + 28ax - 35ax + 28a^2 + 3a^2 - 115a^2 = 0$$

$$7x^2 - 7ax - 84a^2 = 0$$

$$x^2 - ax - 12a^2 = 0$$

$$x^2 - ax = 12a^2$$

$$(x)^2 - 2(x)\left(\frac{a}{2}\right) + \left(\frac{a}{2}\right)^2 = 12a^2 + \left(\frac{a}{2}\right)^2$$

جنرل سے

$$(x - \frac{a}{2})^2 = \frac{12a^2}{1} + \frac{a^2}{4}$$

$$= \frac{48a^2+a^2}{4} = \frac{49a^2}{4}$$

$$\sqrt{(x - \frac{a}{2})^2} = \pm \sqrt{\frac{49a^2}{4}}$$

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

$$x - \frac{a}{2} = \frac{7a}{2} \quad \vee \quad x - \frac{a}{2} = -\frac{7a}{2}$$

$$x = \frac{7a}{2} + \frac{a}{2} \quad \vee \quad x = -\frac{7a}{2} + \frac{a}{2}$$

$$= \frac{7a+a}{2} \quad \vee \quad = \frac{-7a+a}{2}$$

$$= \frac{8a}{2} \quad \vee \quad = \frac{-6a}{2}$$

$$= 4a \quad \vee \quad = -3a$$

$$S\text{-Set} = \{4a, -3a\}$$

Exercise 1.2

Q#1

در درجی فارمولے کا مدد سے حل کریں۔

(i) $2 - x^2 = 7x$

$$-x^2 - 7x + 2 = 0$$

$$x^2 + 7x - 2 = 0$$

منفی ایسا کر دے سے

معیاری مساوات $ax^2+bx+c=0$ سے موازنہ کرنے سے

$a=1, b=7, c=-2$

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

فارمولا

$$= \frac{-7 \pm \sqrt{(-7)^2 - 4(1)(-2)}}{2(1)}$$

$$= \frac{-7 \pm \sqrt{49+8}}{2} = \frac{-7 \pm \sqrt{57}}{2}$$

$$S\text{-Set} = \left\{ \frac{-7 \pm \sqrt{57}}{2} \right\}$$

(ii) $5x^2 + 8x + 1 = 0$

معیاری مساوات $ax^2+bx+c=0$ سے موازنہ کرنے سے

$a=5, b=8, c=1$

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

فارمولا

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

$$= \frac{-8 \pm \sqrt{64-20}}{10} = \frac{-8 \pm \sqrt{44}}{10}$$

$$= \frac{-8 \pm \sqrt{11 \times 4}}{10} = \frac{-8 \pm 2\sqrt{11}}{10}$$

$$= \frac{x(-4 \pm \sqrt{11})}{5} = \frac{-4 \pm \sqrt{11}}{5}$$

$$S\text{-Set} = \left\{ \frac{-4 \pm \sqrt{11}}{5} \right\}$$

(iii) $\sqrt{3}x^2 + x = 4\sqrt{3}$
 $\sqrt{3}x^2 + x - 4\sqrt{3} = 0$
 معیاراً $ax^2 + bx + c = 0$ سے موازنہ کرنے سے
 $a = \sqrt{3}, b = 1, c = -4\sqrt{3}$
 $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ فارمولا
 $x = \frac{-1 \pm \sqrt{(1)^2 - 4(\sqrt{3})(-4\sqrt{3})}}{2(\sqrt{3})}$
 $= \frac{-1 \pm \sqrt{1 + 16(\sqrt{3})^2}}{2\sqrt{3}}$
 $= \frac{-1 \pm \sqrt{1 + 16(3)}}{2\sqrt{3}} = \frac{-1 \pm \sqrt{1 + 48}}{2\sqrt{3}}$
 $= \frac{-1 \pm \sqrt{49}}{2\sqrt{3}} = \frac{-1 \pm 7}{2\sqrt{3}}$
 $x = \frac{-1+7}{2\sqrt{3}} \quad \& \quad x = \frac{-1-7}{2\sqrt{3}}$
 $= \frac{3}{\sqrt{3}} \quad = \frac{-8}{2\sqrt{3}}$
 $= \frac{3}{\sqrt{3}} \quad = -\frac{4}{\sqrt{3}}$
 $= \frac{\sqrt{3} \times 3}{\sqrt{3}} \quad = -\frac{4}{\sqrt{3}}$
 $= \sqrt{\frac{3 \times 3}{3}} = \sqrt{3}$
 S. Set = $\left\{ \sqrt{3}, -\frac{4}{\sqrt{3}} \right\}$

(iv) $4x^2 - 14 = 3x$
 $4x^2 - 3x - 14 = 0$
 معیاراً $ax^2 + bx + c = 0$ سے موازنہ کرنے سے
 $a = 4, b = -3, c = -14$
 $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ فارمولا
 $x = \frac{-(-3) \pm \sqrt{(-3)^2 - 4(4)(-14)}}{2(4)}$
 $= \frac{3 \pm \sqrt{9 + 224}}{8} = \frac{3 \pm \sqrt{233}}{8}$
 S. Set = $\left\{ \frac{3 \pm \sqrt{233}}{8} \right\}$

(v) $6x^2 - 3 - 7x = 0$
 $6x^2 - 7x - 3 = 0$
 معیاراً $ax^2 + bx + c = 0$ سے موازنہ کرنے سے
 $a = 6, b = -7, c = -3$
 $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ فارمولا
 $= \frac{-(-7) \pm \sqrt{(-7)^2 - 4(6)(-3)}}{2(6)}$

(5) $x = \frac{7 \pm \sqrt{49 + 72}}{12} = \frac{7 \pm \sqrt{121}}{12}$
 $= \frac{7 \pm 11}{12}$
 $x = \frac{7+11}{12} \quad \& \quad x = \frac{7-11}{12}$
 $= \frac{3+8}{6} \quad = \frac{-4}{3}$
 $= \frac{3}{2} \quad = -\frac{1}{3}$
 S. Set = $\left\{ \frac{3}{2}, -\frac{1}{3} \right\}$

(vi) $3x^2 + 8x + 2 = 0$
 معیاراً $ax^2 + bx + c = 0$ سے موازنہ کرنے سے
 $a = 3, b = 8, c = 2$
 $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ فارمولا
 $= \frac{-8 \pm \sqrt{(8)^2 - 4(3)(2)}}{2(3)}$
 $= \frac{-8 \pm \sqrt{64 - 24}}{6} = \frac{-8 \pm \sqrt{40}}{6}$
 $= \frac{-8 \pm \sqrt{10 \times 4}}{6} = \frac{-8 \pm 2\sqrt{10}}{6}$
 $= \frac{-4 \pm \sqrt{10}}{3}$
 S. Set = $\left\{ -\frac{4 \pm \sqrt{10}}{3} \right\}$

(vii) $\frac{3}{x-6} - \frac{4}{x-5} = 1$
 $\frac{3(x-5) - 4(x-6)}{(x-6)(x-5)} = 1$
 معیاراً $(x-6)(x-5)$ سے ضرب دینے سے
 $3x - 15 - 4x + 24 = 1(x-6)(x-5)$
 $-x + 9 = x^2 - 5x - 6x + 30$
 $-x + 9 - x^2 + 5x + 6x - 30 = 0$
 $-x^2 + 10x - 21 = 0$
 $x^2 - 10x + 21 = 0$
 معیاراً $ax^2 + bx + c = 0$ سے موازنہ کرنے سے
 $a = 1, b = -10, c = +21$
 $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ فارمولا
 $x = \frac{-(-10) \pm \sqrt{(-10)^2 - 4(1)(+21)}}{2(1)}$
 $= \frac{10 \pm \sqrt{100 - 84}}{2} = \frac{10 \pm \sqrt{16}}{2}$
 $= \frac{10 \pm 4}{2}$
 $x = \frac{10+4}{2} \quad \& \quad x = \frac{10-4}{2}$
 $= \frac{14}{2} = 7 \quad = \frac{6}{2} = 3$
 S. Set = $\{7, 3\}$

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

$\frac{(x+2)(2x) - (4-x)(x-1)}{(x-1)(2x)} = \frac{7}{3}$

سے نیچے لے کر $(x-1)(2x)$

$2x^2 + 4x - (4x - 4 - x^2 + x) = \frac{7}{3}(x-1)(2x)$

$2x^2 + 4x - 4x + 4 + x^2 - x = \frac{7}{3}(2x^2 - 2x)$
سے نیچے لے کر 3

$6x^2 + 12 + 3x^2 - 3x = 7(2x^2 - 2x)$

$9x^2 - 3x + 12 = 14x^2 - 14x$

$9x^2 - 14x^2 - 3x + 14x + 12 = 0$

$-5x^2 + 11x + 12 = 0$

$5x^2 - 11x - 12 = 0$

معماری صورت سے $ax^2 + bx + c = 0$ سے موازنہ کرنے سے

$a = 5, b = -11, c = -12$

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

$x = \frac{-(-11) \pm \sqrt{(-11)^2 - 4(5)(-12)}}{2(5)}$

$= \frac{11 \pm \sqrt{121 + 240}}{10} = \frac{11 \pm \sqrt{361}}{10} = \frac{11 \pm 19}{10}$

$x = \frac{11+19}{10}$, $x = \frac{11-19}{10}$

$= \frac{30}{10} = 3$

$= \frac{-8}{10} = -\frac{4}{5}$

S. Set = $\{3, -\frac{4}{5}\}$

(ix) $\frac{a}{x-b} + \frac{b}{x-a} = 2$

$\frac{a(x-a) + b(x-b)}{(x-b)(x-a)} = 2$

$ax - a^2 + bx - b^2 = 2(x-b)(x-a)$

$ax - a^2 + bx - b^2 = 2(x^2 - ax - bx + ab)$

$ax + bx - a^2 - b^2 = 2x^2 - 2ax - 2bx + 2ab$

$-2x^2 + ax + bx + 2ax + 2bx - a^2 - b^2 + 2ab = 0$
سے نیچے لے کر 2

$2x^2 - ax - bx - 2ax - 2bx + a^2 + b^2 + 2ab = 0$

$2x^2 - 3ax - 3bx + (a+b)^2 = 0$

$2x^2 - 3(a+b)x + (a+b)^2 = 0$

معماری صورت سے $Ax^2 + Bx + C = 0$ سے موازنہ کرنے سے

$A = 2, B = -3(a+b), C = (a+b)^2$

$x = \frac{-B \pm \sqrt{B^2 - 4AC}}{2A}$ فارمولا

(6) $x = \frac{-[-3(a+b)] \pm \sqrt{[-3(a+b)]^2 - 4(2)(a+b)^2}}{2(2)}$
 $= \frac{3(a+b) \pm \sqrt{9(a+b)^2 - 8(a+b)^2}}{4}$
 $= \frac{3(a+b) \pm \sqrt{(a+b)^2}}{4} = \frac{3(a+b) \pm (a+b)}{4}$
 $x = \frac{3(a+b) + (a+b)}{4}$, $x = \frac{3(a+b) - (a+b)}{4}$
 $= \frac{3a+3b+a+b}{4}$, $x = \frac{3a+3b-a-b}{4}$
 $= \frac{4a+4b}{4}$, $= \frac{2a+2b}{4}$
 $= \frac{x(a+b)}{x}$, $= \frac{x(a+b)}{x}$
 $= a+b$, $= \frac{a+b}{2}$
 S. Set = $\left\{ \frac{4a+4b}{4}, \frac{a+b}{2} \right\}$

(x) $l(x-m) - lx^2 + (2l+m)x = 0$, $l \neq 0$
 $-lx^2 + (2l+m)x - (l+m) = 0$
 $lx^2 - (2l+m)x + (l+m) = 0$
 معماری صورت سے موازنہ کرنے سے $ax^2 + bx + c = 0$

$a = l, b = -(2l+m), c = (l+m)$

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

$x = \frac{-(2l+m) \pm \sqrt{[-(2l+m)]^2 - 4(l)(l+m)}}{2(l)}$

$= \frac{2l+m \pm \sqrt{4l^2 + m^2 + 4lm - 4l^2 - 4lm}}{2l}$

$= \frac{2l+m \pm \sqrt{m^2}}{2l} = \frac{2l+m \pm m}{2l}$

$x = \frac{2l+m+m}{2l}$, $x = \frac{2l+m-m}{2l}$

$= \frac{2l+2m}{2l}$, $= \frac{2l}{2l}$
 $= 1$

$= \frac{x(l+m)}{x}$, S. Set = $\left\{ \frac{l+m}{l}, 1 \right\}$

Exercise 1.3

Q#1

$$2x^4 - 11x^2 + 5 = 0$$

فرض کیا $x^2 = y$ & $x^4 = y^2$

$$2y^2 - 11y + 5 = 0$$

سیاری اکرش سے موازنہ کرنے سے

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

$$= \frac{-(-11) \pm \sqrt{(-11)^2 - 4(2)(5)}}{2(2)}$$

$$= \frac{11 \pm \sqrt{121 - 40}}{4} = \frac{11 \pm \sqrt{81}}{4} = \frac{11 \pm 9}{4}$$

$$y = \frac{11+9}{4} \quad \& \quad y = \frac{11-9}{4}$$

$$= \frac{20}{4} = 5 \quad \& \quad = \frac{2}{4} = \frac{1}{2}$$

جب $y = 5$ ہو تو

$$x^2 = 5$$

$$x^2 = 5$$

$$x = \pm \sqrt{5}$$

جب $x = \frac{1}{2}$ ہو تو

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

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

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

$$S.set = \left\{ \pm \sqrt{5}, \pm \frac{1}{\sqrt{2}} \right\}$$

Q#2

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

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

فرض کیا $x^2 = y$ & $x^4 = y^2$

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

$$2y^2 - 8y - y + 4 = 0$$

$$2y(y-4) - 1(y-4) = 0$$

$$(y-4)(2y-1) = 0$$

$$y-4=0 \quad \text{or} \quad 2y-1=0$$

$$y=4$$

$$2y=1$$

$$y = \frac{1}{2}$$

جب $y = 4$ ہو تو

$$x^2 = 4$$

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

$$= \pm 2 \quad S.set = \left\{ \pm 2, \pm \frac{1}{\sqrt{2}} \right\}$$

جب $y = \frac{1}{2}$ ہو تو

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

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

Q#3

$$5x^{1/2} = 7x^{1/4} - 2$$

$$5x^{1/2} - 7x^{1/4} + 2 = 0$$

فرض کیا $x^{1/4} = y$ & $(x^{1/4})^2 = y^2$

$$x^{1/2} = y^2$$

$$5y^2 - 7y + 2 = 0$$

$$5y^2 - 5y - 2y + 2 = 0$$

اسیے فارمولہ کو مدد سے نکالیں
(حل کیا جا سکتا ہے)

7

$$5y(y-1) - 2(y-1) = 0$$

$$(y-1)(5y-2) = 0$$

$$y-1=0$$

$$y=1$$

$$\text{or } 5y-2=0$$

$$5y=2$$

$$y = \frac{2}{5}$$

جب $y = 1$ ہو تو

$$x^{1/4} = y = 1$$

$$(x^{1/4})^4 = (1)^4$$

$$x = 1$$

$$S.set = \left\{ 1, \frac{16}{625} \right\}$$

جب $y = \frac{2}{5}$ ہو تو

$$x^{1/4} = y = \frac{2}{5}$$

$$(x^{1/4})^4 = \left(\frac{2}{5}\right)^4$$

$$x = \frac{16}{625}$$

Q#4

$$x^{2/3} + 54 = 15x^{1/3}$$

$$x^{2/3} - 15x^{1/3} + 54 = 0$$

فرض کیا $x^{1/3} = y$ & $(x^{1/3})^2 = y^2$

$$y^2 - 15y + 54 = 0$$

$$y^2 - 9y - 6y + 54 = 0$$

$$y(y-9) - 6(y-9) = 0$$

$$(y-9)(y-6) = 0$$

$$y-9=0 \quad \text{or} \quad y-6=0$$

$$y=9$$

$$y=6$$

جب $y = 9$ ہو تو

$$x^{1/3} = 9$$

$$(x^{1/3})^3 = (9)^3$$

$$x = 729$$

$$S.set = \{ 729, 216 \}$$

جب $y = 6$ ہو تو

$$x^{1/3} = 6$$

$$(x^{1/3})^3 = (6)^3$$

$$x = 216$$

Q#5

$$3x^2 + 5 = 8x^{-1}$$

$$3x^2 - 8x^{-1} + 5 = 0$$

فرض کیا $x^{-1} = y$ & $x^2 = y^{-2}$

$$3y^2 - 8y + 5 = 0$$

$$3y^2 - 3y - 5y + 5 = 0$$

$$3y(y-1) - 5(y-1) = 0$$

$$(y-1)(3y-5) = 0$$

$$y-1=0$$

$$y=1$$

$$\text{or } 3y-5=0$$

$$3y=5$$

$$y = \frac{5}{3}$$

جب $y = 1$ ہو تو

$$x^{-1} = y = 1$$

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

$$x = 1$$

$$S.set = \left\{ 1, \frac{3}{5} \right\}$$

جب $y = \frac{5}{3}$ ہو تو

$$x^{-1} = y = \frac{5}{3}$$

$$\frac{1}{x} = \frac{5}{3}$$

$$x = \frac{3}{5}$$

Q#6 $(2x^2+1) + \frac{3}{(2x^2+1)} = 4$

فرض کیا $2x^2+1 = y$
 ج سے لے کر دینے سے

$y + \frac{3}{y} = 4$

$y^2 + 3 = 4y$

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

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

$y(y-3) - 1(y-3) = 0$

$(y-3)(y-1) = 0$

$y-3=0$ or $y-1=0$

$y=3$

$y=1$

جب $y=3$ ہوگی

جب $y=1$ ہوگی

$2x^2+1 = y$

$2x^2+1 = y$

$2x^2+1 = 3$

$2x^2+1 = 1$

$2x^2 = 3-1$

$2x^2 = 1-1$

$2x^2 = 2$

$2x^2 = 0$

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

$x^2 = 0$

$x = \pm \sqrt{1}$

$= \pm 1$

S. set = $\{0, \pm 1\}$

Q#7 $\frac{x}{x-3} + 4\left(\frac{x-3}{x}\right) = 4$

فرض کیا $\frac{x}{x-3} = y$

$y + \frac{4}{y} = 4$

$y^2 + 4 = 4y$

$y^2 - 4y + 4 = 0$

$y^2 - 2y - 2y + 4 = 0$

$y(y-2) - 2(y-2) = 0$

$(y-2)(y-2) = 0$

$y-2=0$ or $y-2=0$

$y=2$

$y=2$

جب $y=2$ ہوگی

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

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

$x = 2x - 6$

$x - 2x = -6$

$-x = -6$

$x = 6$

S. set = $\{6\}$

Q#8 $\frac{4x+1}{4x-1} + \frac{4x-1}{4x+1} = 2\frac{1}{6}$

فرض کیا $\frac{4x+1}{4x-1} = y$

$y + \frac{1}{y} = \frac{13}{6}$

$6y^2 + 6 = 13y$

$6y^2 - 13y + 6 = 0$

$6y^2 - 4y - 9y + 6 = 0$

6 سے لے کر دینے سے

8 $2y(3y-2) - 3(3y-2) = 0$

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

$3y-2=0$

$3y=2$

$y = \frac{2}{3}$

جب $y = \frac{2}{3}$ ہوگی

$\frac{4x+1}{4x-1} = y = \frac{2}{3}$

$12x+3 = 8x-2$

$12x-8x = -2-3$

$4x = -5$

$x = -\frac{5}{4}$

S. set = $\{-\frac{5}{4}, \frac{5}{4}\}$

or $2y-3=0$

$2y=3$

$y = \frac{3}{2}$

جب $y = \frac{3}{2}$ ہوگی

$\frac{4x+1}{4x-1} = y = \frac{3}{2}$

$8x+2 = 12x-3$

$8x-12x = -3-2$

$-4x = -5$

$x = \frac{-5}{-4} = \frac{5}{4}$

Q#9 $\frac{x-a}{x+a} - \frac{x+a}{x-a} = \frac{7}{12}$

فرض کیا $\frac{x-a}{x+a} = y$

$y - \frac{1}{y} = \frac{7}{12}$

$12y^2 - 12 = 7y$

$12y^2 - 7y - 12 = 0$

$12y^2 - 16y + 9y - 12 = 0$

$4y(3y-4) + 3(3y-4) = 0$

$(3y-4)(4y+3) = 0$

$3y-4=0$

$3y=4$

$y = \frac{4}{3}$

جب $y = \frac{4}{3}$ ہوگی

$\frac{x-a}{x+a} = y = \frac{4}{3}$

$3x-3a = 4x+4a$

$3x-4x = 4a+3a$

$-x = 7a$

$x = -7a$

S. set = $\{-7a, a/7\}$

or $4y+3=0$

$4y=-3$

$y = -\frac{3}{4}$

جب $y = -\frac{3}{4}$ ہوگی

$\frac{x-a}{x+a} = y = -\frac{3}{4}$

$4x-4a = -3x-3a$

$4x+3x = -3a+4a$

$7x = a$

$x = a/7$

Q#10 $x^4 - 2x^3 - 2x^2 + 2x + 1 = 0$

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

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

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

$(x^2 + \frac{1}{x^2}) - 2(x - \frac{1}{x}) - 2 = 0$

$(x - \frac{1}{x})^2 = y^2$ & $x - \frac{1}{x} = y$

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

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

$y^2 + 2 - 2y - 2 = 0$

$y^2 - 2y = 0 \Rightarrow y(y-2) = 0$

$y = 0$ or $y - 2 = 0$
 $y = 2$
 جب $y = 0$ ہو تو
 $x - \frac{1}{x} = y = 0$
 $x - \frac{1}{x} = 0$
 $x^2 - 1 = 0$ سے x
 $x^2 = 1$
 $x = \pm \sqrt{1}$
 $= \pm 1$
 جب $y = 2$ ہو تو
 $x - \frac{1}{x} = y = 2$
 $x - \frac{1}{x} = 2$
 سے x پر ضرب کریں
 $x^2 - 1 = 2x$
 $x^2 - 2x - 1 = 0$
 معیاری صورت سے موازنہ کرنے سے
 $a = 1, b = -2, c = -1$
 $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
 $= \frac{-(-2) \pm \sqrt{(-2)^2 - 4(1)(-1)}}{2(1)}$
 $= \frac{2 \pm \sqrt{4+4}}{2} = \frac{2 \pm \sqrt{8}}{2}$
 $= \frac{2 \pm \sqrt{2 \times 4}}{2} = \frac{2 \pm 2\sqrt{2}}{2}$
 $= \frac{x(1 \pm \sqrt{2})}{x}$
 $= 1 \pm \sqrt{2}$
 S. set = $\{\pm 1, 1 \pm \sqrt{2}\}$

Q#11 $2x^4 + x^3 - 6x^2 + x + 2 = 0$
 $\frac{2x^4}{x^2} + \frac{x^3}{x^2} - \frac{6x^2}{x^2} + \frac{x}{x^2} + \frac{2}{x^2} = 0$
 $2x^2 + x - 6 + \frac{1}{x} + \frac{2}{x^2} = 0$
 $2x^2 + \frac{2}{x^2} + x + \frac{1}{x} - 6 = 0$
 $2(x^2 + \frac{1}{x^2}) + (x + \frac{1}{x}) - 6 = 0$
 فرض کریں
 $(x + \frac{1}{x}) = y$ & $x + \frac{1}{x} = y$
 $x^2 + \frac{1}{x^2} + 2 = y^2$
 $x^2 + \frac{1}{x^2} = y^2 - 2$
 $2(y^2 - 2) + y - 6 = 0$
 $2y^2 - 4 + y - 6 = 0$
 $2y^2 + y - 10 = 0$
 $2y^2 + 5y - 4y - 10 = 0$
 $y(2y + 5) - 2(2y + 5) = 0$
 $(2y + 5)(y - 2) = 0$
 $2y + 5 = 0$ or $y - 2 = 0$
 $2y = -5$ $y = 2$
 $y = -5/2$
 جب $y = -5/2$ ہو تو
 $x + \frac{1}{x} = y$
 $x + \frac{1}{x} = -5/2$
 $2x^2 + 2 = -5x$
 جب $y = 2$ ہو تو
 $x + \frac{1}{x} = y$
 $x + \frac{1}{x} = 2$
 $x^2 + 1 = 2x$

Q#9 $2x^2 + 5x + 2 = 0$
 $2x^2 + 4x + x + 2 = 0$
 $2x(x+2) + 1(x+2) = 0$
 $(x+2)(2x+1) = 0$
 $x+2 = 0$ or $2x+1 = 0$
 $x = -2$ $2x = -1$
 $x = -1/2$
 S. set = $\{-2, -1/2, 1\}$
 $x^2 - 2x + 1 = 0$
 $x^2 - x - x + 1 = 0$
 $x(x-1) - 1(x-1) = 0$
 $(x-1)(x-1) = 0$
 $x-1 = 0$ or $x-1 = 0$
 $x = 1$ or $x = 1$

Q#12 $4 \cdot 2^{2x+1} - 9 \cdot 2^x + 1 = 0$
 $4 \cdot 2^x \cdot 2^1 - 9 \cdot 2^x + 1 = 0$
 $4 \cdot y^2 \cdot 2 - 9 \cdot y + 1 = 0$
 $8y^2 - 9y + 1 = 0$
 $8y^2 - 8y - y + 1 = 0$
 $8y(y-1) - 1(y-1) = 0$
 $(y-1)(8y-1) = 0$
 $y-1 = 0$ or $8y-1 = 0$
 $y = 1$ $8y = 1$
 $y = 1/8$
 فرض کریں
 $2^x = y^2$ & $2^x = y$
 جب $y = 1$ ہو تو
 $2^x = y = 1$
 $2^x = 2^0$
 $x = 0$
 جب $y = 1/8$ ہو تو
 $2^x = y = 1/8$
 $2^x = \frac{1}{2^3} = 2^{-3}$
 $x = -3$
 S. set = $\{0, -3\}$

Q#13 $\frac{2^{x+2}}{3} = 12 \cdot 3^x - 3$
 $3 \cdot 3^x - 12 \cdot 3^x + 3 = 0$
 $y^2 \cdot 3^2 - 12 \cdot y + 3 = 0$
 $9y^2 - 12y + 3 = 0$
 $3y^2 - 4y + 1 = 0$
 $3y^2 - 3y - y + 1 = 0$
 $3y(y-1) - 1(y-1) = 0$
 $(y-1)(3y-1) = 0$
 $y-1 = 0$ or $3y-1 = 0$
 $y = 1$ $3y = 1$
 $y = 1/3$
 فرض کریں
 $3^{2x} = y^2$ & $3^x = y$
 جب $y = 1$ ہو تو
 $3^x = y = 1$
 $3^x = 3^0$
 $x = 0$
 جب $y = 1/3$ ہو تو
 $3^x = y = 1/3$
 $3^x = 3^{-1}$
 $x = -1$
 S. set = $\{0, -1\}$

Q#14 $2^x + 64 \cdot 2^{-x} - 20 = 0$
 $y + \frac{64}{y} - 20 = 0$
 $y^2 + 64 - 20y = 0$
 $y^2 - 20y + 64 = 0$
 فرض کریں
 $2^x = y$ & $2^x = y$

$$y^2 - 16y - 4y + 64 = 0$$

$$y(y-16) - 4(y-16) = 0$$

$$(y-16)(y-4) = 0$$

$$y-16=0 \quad \text{or} \quad y-4=0$$

$$y=16 \quad \quad \quad y=4$$

جب $y=16$ ہو تو

$$x^2 = y = 16$$

$$x^2 = 2^4$$

$$x = 4$$

S. Set = $\{4, 2\}$

جب $y=4$ ہو تو

$$x^2 = y = 4$$

$$x^2 = 2^2$$

$$x = 2$$

Q*15 $(x+1)(x+3)(x-5)(x-7) = 192$

$$(x+1)(x-5)(x+3)(x-7) = 192$$

$$(x^2 - 5x + x - 5)(x^2 - 7x + 3x - 21) = 192$$

$$(x^2 - 4x - 5)(x^2 - 4x - 21) = 192$$

$$x^2 - 4x = y \quad \text{فرض کیا}$$

$$(y-5)(y-21) = 192$$

$$y^2 - 26y - 5y + 105 - 192 = 0$$

$$y^2 - 26y - 87 = 0$$

$$y^2 - 29y + 3y - 87 = 0$$

$$y(y-29) + 3(y-29) = 0$$

اسے فارمولا سے بھی حل کیا جا سکتا ہے

$$(y-29)(y+3) = 0$$

$$y-29=0 \quad \text{or} \quad y+3=0$$

$$y=29 \quad \quad \quad y=-3$$

جب $y=29$ ہو تو

$$x^2 - 4x = y$$

$$x^2 - 4x = 29$$

$$x^2 - 4x - 29 = 0$$

فارمولا سے حل کرنے سے

$$a=1, b=-4, c=-29$$

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

$$= \frac{-(-4) \pm \sqrt{(-4)^2 - 4(1)(-29)}}{2(1)}$$

$$= \frac{4 \pm \sqrt{16 + 116}}{2}$$

$$= \frac{4 \pm \sqrt{132}}{2}$$

$$= \frac{4 \pm \sqrt{4 \times 33}}{2}$$

$$= \frac{4 \pm 2\sqrt{33}}{2}$$

$$= \frac{4 \pm 2\sqrt{33}}{2}$$

$$= 2 \pm \sqrt{33}$$

S. Set = $\{1, 3, 2 \pm \sqrt{33}\}$

Q*16 $(x-1)(x-2)(x-8)(x+5) + 360 = 0$

$$(x^2 - 2x - x + 2)(x^2 + 5x - 8x - 40) + 360 = 0$$

$$(x^2 - 3x + 2)(x^2 - 3x - 40) + 360 = 0$$

$$x^2 - 3x = y \quad \text{فرض کیا}$$

$$(y+2)(y-40) + 360 = 0$$

$$y^2 - 40y + 2y - 80 + 360 = 0$$

$$y^2 - 38y + 280 = 0$$

$$y^2 - 28y - 10y + 280 = 0$$

$$y(y-28) - 10(y-28) = 0$$

$$(y-28)(y-10) = 0$$

$$y-28=0 \quad \text{or} \quad y-10=0$$

$$y=28 \quad \quad \quad y=10$$

280 x 1
140 x 2
70 x 4
56 x 5
40 x 7
35 x 8
-28 x -10

جب $y=28$ ہو تو

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

$$x^2 - 3x = 28$$

$$x^2 - 3x - 28 = 0$$

$$x^2 - 7x + 4x - 28 = 0$$

$$x(x-7) + 4(x-7) = 0$$

$$(x-7)(x+4) = 0$$

$$x-7=0 \quad \text{or} \quad x+4=0$$

$$x=7 \quad \quad \quad x=-4$$

S. Set = $\{-4, -2, 5, 7\}$

جب $y=10$ ہو تو

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

$$x^2 - 3x = 10$$

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

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

$$x(x-5) + 2(x-5) = 0$$

$$(x-5)(x+2) = 0$$

$$(x-5) = 0 \quad \text{or} \quad x+2 = 0$$

$$x=5 \quad \quad \quad x=-2$$

Exercise 1.4

Q*1 $2x+5 = \sqrt{7x+16}$

حل کریں

طریقہ کا مربع لینے سے

$$(2x+5)^2 = (\sqrt{7x+16})^2$$

$$4x^2 + 25 + 20x = 7x + 16$$

$$4x^2 + 20x - 7x + 25 - 16 = 0$$

$$4x^2 + 13x + 9 = 0$$

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

$$4x(x+1) + 9(x+1) = 0$$

$$(x+1)(4x+9) = 0$$

$$x+1=0 \quad \text{or} \quad 4x+9=0$$

$$x=-1 \quad \quad \quad 4x=-9$$

$$x=-9/4$$

فارمولا یا تجزیہ دونوں طریقوں سے حل کیا جا سکتا ہے

جب $x=-1$ ہو تو

$$2x+5 = \sqrt{7x+16}$$

$$2(-1)+5 = \sqrt{7(-1)+16}$$

$$-2+5 = \sqrt{-7+16}$$

$$3 = \sqrt{9}$$

$$3 = 3$$

پہلے درجہ کی ثابت ہوئے ہیں لہذا

S. Set = $\{-1, -9/4\}$

جب $x=-9/4$ ہو تو

$$2x+5 = \sqrt{7x+16}$$

$$2(-9/4)+5 = \sqrt{7(-9/4)+16}$$

$$-9/2 + 5 = \sqrt{-63/4 + 16}$$

$$-9/2 + 5 = \sqrt{-63+64}$$

$$-9/2 + 5 = \sqrt{1}$$

$$-9/2 + 5 = 1$$

$$-9/2 + 10/2 = 2/2$$

$$-9 + 10 = 2$$

$$1 = 2$$

Q#2 $\sqrt{x+3} = 3x-1$

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

$x+3 = 9x^2+1-6x$

$0 = 9x^2-6x-x+1-3$

$9x^2-7x-2 = 0$

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

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

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

$x-1 = 0$

or $9x+2 = 0$

$x = 1$

$9x = -2$

جب $x = 1$ ہو

تہاں $x = -\frac{2}{9}$ جب

$\sqrt{x+3} = 3x-1$

$\sqrt{1+3} = 3(1)-1$

$\sqrt{4} = 3-1$

$2 = 2$

$\sqrt{x+3} = 3x-1$

$\sqrt{-\frac{2}{9}+\frac{3}{1}} = 3(-\frac{2}{9})-1$

$\sqrt{\frac{-2+27}{9}} = -\frac{2}{3}-\frac{1}{1}$

$\sqrt{\frac{25}{9}} = \frac{-2-3}{3}$

جس $x = -\frac{2}{9}$ فالٹروٹ ہے

جس $x = -\frac{2}{9}$ فالٹروٹ ہے لہذا

S.set = {1}

Q#3 $4x = \sqrt{13x+14} - 3$

$4x+3 = \sqrt{13x+14}$

$(4x+3)^2 = (\sqrt{13x+14})^2$

$16x^2+9+24x = 13x+14$

$16x^2+24x-13x+9-14 = 0$

$16x^2+11x-5 = 0$

$16x^2+16x-5x-5 = 0$

$16x(x+1)-5(x+1) = 0$

$(x+1)(16x-5) = 0$

$x+1 = 0$

or $16x-5 = 0$

$x = -1$

$16x = 5$

$x = 5/16$

جب $x = -1$ ہو

تہاں $x = 5/16$ جب

$4x = \sqrt{13x+14} - 3$

$4x = \sqrt{13x+14} - 3$

$4(-1) = \sqrt{13(-1)+14} - 3$

$4(\frac{5}{16}) = \sqrt{13(\frac{5}{16})+14} - 3$

$-4 = \sqrt{-13+14} - 3$

$\frac{5}{4} = \sqrt{\frac{65}{16} + \frac{14}{1}} - 3$

$-4 = \sqrt{1} - 3$

$\frac{5}{4} = \sqrt{\frac{65+224}{16}} - 3$

$-4 = 1-3$

$\frac{5}{4} = \sqrt{\frac{289}{16}} - 3$

$-4 \neq -2$

$\frac{5}{4} = \frac{17}{4} - \frac{3}{1}$

$\frac{5}{4} = \frac{17-12}{4}$

$\frac{5}{4} = \frac{5}{4}$

جس $x = -1$ فالٹروٹ ہے

S.set = {5/16}

Q#4 $\sqrt{3x+100} - x = 4$

$\sqrt{3x+100} = 4+x$

$(\sqrt{3x+100})^2 = (4+x)^2$

$3x+100 = 16+x^2+8x$

$0 = x^2+8x-3x+16-100$

$0 = x^2+5x-84$

$x^2+5x-84 = 0$

$x^2+12x-7x-84 = 0$

$x(x+12)-7(x+12) = 0$

$(x+12)(x-7) = 0$

$x+12 = 0$

or $x-7 = 0$

$x = -12$

$x = 7$

جب $x = -12$ ہو

جب $x = 7$ ہو

$\sqrt{3x+100} - x = 4$

$\sqrt{3x+100} - x = 4$

$\sqrt{3(-12)+100} - (-12) = 4$

$\sqrt{3(7)+100} - 7 = 4$

$\sqrt{-36+100} + 12 = 4$

$\sqrt{21+100} - 7 = 4$

$\sqrt{64} + 12 = 4$

$\sqrt{121} - 7 = 4$

$8+12 = 4$

$11-7 = 4$

$20 \neq 4$

$4 = 4$

جس $x = -12$ فالٹروٹ ہے

جس $x = 7$ فالٹروٹ ہے

S.set = {7}

Q#5 $\sqrt{x+5} + \sqrt{x+21} = \sqrt{x+60}$

$(\sqrt{x+5} + \sqrt{x+21})^2 = (\sqrt{x+60})^2$

$(\sqrt{x+5})^2 + (\sqrt{x+21})^2 + 2(\sqrt{x+5})(\sqrt{x+21}) = x+60$

$x+5 + x+21 + 2\sqrt{x^2+21x+5x+105} = x+60$

$2x+26 + 2\sqrt{x^2+26x+105} = x+60$

$2\sqrt{x^2+26x+105} = x-2x+60-26$

$2\sqrt{x^2+26x+105} = -x+34$

$(2\sqrt{x^2+26x+105})^2 = (-x+34)^2$

$4(x^2+26x+105) = x^2+1156-68x$

$4x^2+104x+420-x^2+68x-1156 = 0$

$3x^2+172x-736 = 0$

$3x^2+184x-12x-736 = 0$

$x(3x+184)-4(3x+184) = 0$

$(3x+184)(x-4) = 0$

$3x+184 = 0$

or

$x-4 = 0$

$3x = -184$

$x = 4$

$x = -184/3$

تہاں

جب $x = -184/3$ ہو

$\sqrt{x+5} + \sqrt{x+21} = \sqrt{x+60}$

$\sqrt{-\frac{184}{3}+5} + \sqrt{-\frac{184}{3}+21} = \sqrt{-\frac{184}{3}+60}$

$$\sqrt{\frac{-184+15}{3}} + \sqrt{\frac{-184+63}{3}} = \sqrt{\frac{-184+180}{3}}$$

$$\sqrt{\frac{-169}{3}} + \sqrt{\frac{-121}{3}} = \sqrt{\frac{-4}{3}}$$

$$\frac{13i}{\sqrt{3}} + \frac{11i}{\sqrt{3}} = \frac{2i}{\sqrt{3}}$$

$$\frac{13i+11i}{\sqrt{3}} = \frac{2i}{\sqrt{3}}$$

$$\frac{24i}{\sqrt{3}} \neq \frac{2i}{\sqrt{3}}$$

لہذا $x = \frac{-184}{3}$ فالٹوررٹ ہے

S. Set = {4}

Q*6 $\sqrt{x+1} + \sqrt{x-2} = \sqrt{x+6}$

طرفین کا مربع لینے سے $(\sqrt{x+1} + \sqrt{x-2})^2 = (\sqrt{x+6})^2$

$$(\sqrt{x+1})^2 + (\sqrt{x-2})^2 + 2(\sqrt{x+1})(\sqrt{x-2}) = x+6$$

$$x+1+x-2+2\sqrt{x^2-x-2} = x+6$$

$$2x-1+2\sqrt{x^2-x-2} = x+6$$

$$2\sqrt{x^2-x-2} = x-2x+6+1$$

$$2\sqrt{x^2-x-2} = -x+7$$

$$(2\sqrt{x^2-x-2})^2 = (-x+7)^2$$

$$4(x^2-x-2) = x^2+49-14x$$

$$4x^2-4x-8-x^2-49+14x = 0$$

$$3x^2+10x-57 = 0$$

$$3x^2+19x-9x-57 = 0$$

$$x(3x+19)-3(3x+19) = 0$$

$$(3x+19)(x-3) = 0$$

$$3x+19 = 0 \quad \text{or} \quad x-3 = 0$$

$$3x = -19$$

$$x = -\frac{19}{3}$$

جب $x = -\frac{19}{3}$ ہے

$$\sqrt{x+1} + \sqrt{x-2} = \sqrt{x+6}$$

$$\sqrt{-\frac{19}{3}+1} + \sqrt{-\frac{19}{3}-2} = \sqrt{-\frac{19}{3}+6}$$

$$\sqrt{\frac{-19+3}{3}} + \sqrt{\frac{-19-6}{3}} = \sqrt{\frac{-19+18}{3}}$$

$$\sqrt{\frac{-16}{3}} + \sqrt{\frac{-25}{3}} = \sqrt{\frac{-1}{3}}$$

$$\frac{4i}{\sqrt{3}} + \frac{5i}{\sqrt{3}} = \frac{1i}{\sqrt{3}}$$

$$\frac{4i+5i}{\sqrt{3}} = \frac{1i}{\sqrt{3}}$$

$$\frac{9i}{\sqrt{3}} \neq \frac{1i}{\sqrt{3}}$$

لہذا $x = -\frac{19}{3}$ فالٹوررٹ ہے

جب $x = 4$ ہے

$$\sqrt{x+5} + \sqrt{x+1} = \sqrt{x+6}$$

$$\sqrt{4+5} + \sqrt{4+1} = \sqrt{4+6}$$

$$\sqrt{9} + \sqrt{5} = \sqrt{10}$$

$$3+5 = 8$$

$$8 = 8$$

Q*7 $\sqrt{11-x} - \sqrt{6-x} = \sqrt{27-x}$

طرفین کا مربع لینے سے $(\sqrt{11-x} - \sqrt{6-x})^2 = (\sqrt{27-x})^2$

$$(\sqrt{11-x})^2 + (\sqrt{6-x})^2 - 2(\sqrt{11-x})(\sqrt{6-x}) = 27-x$$

$$11-x+6-x-2\sqrt{66-11x-6x+x^2} = 27-x$$

$$17-2x-2\sqrt{x^2-17x+66} = 27-x$$

$$-2\sqrt{x^2-17x+66} = 27-x-17+x$$

$$-2\sqrt{x^2-17x+66} = 10+x$$

$$(-2\sqrt{x^2-17x+66})^2 = (10+x)^2$$

$$4(x^2-17x+66) = 100+x^2+20x$$

$$4x^2-68x+264-100-x^2-20x = 0$$

$$3x^2-88x+164 = 0$$

$$3x^2-82x-6x+164 = 0$$

$$x(3x-82)-2(3x-82) = 0$$

$$(3x-82)(x-2) = 0$$

$$3x-82 = 0 \quad \text{or} \quad x-2 = 0$$

$$3x = 82$$

$$x = \frac{82}{3}$$

جب $x = \frac{82}{3}$ ہے

$$\sqrt{11-x} - \sqrt{6-x} = \sqrt{27-x}$$

$$\sqrt{\frac{11-\frac{82}{3}}{3}} - \sqrt{\frac{6-\frac{82}{3}}{3}} = \sqrt{\frac{27-\frac{82}{3}}{3}}$$

$$\sqrt{\frac{33-82}{3}} - \sqrt{\frac{18-82}{3}} = \sqrt{\frac{81-82}{3}}$$

$$\sqrt{\frac{-49}{3}} - \sqrt{\frac{-64}{3}} = \sqrt{\frac{-1}{3}}$$

$$\frac{7i}{\sqrt{3}} - \frac{8i}{\sqrt{3}} = \frac{1i}{\sqrt{3}}$$

$$\frac{7i-8i}{\sqrt{3}} = \frac{1i}{\sqrt{3}}$$

$$\frac{-i}{\sqrt{3}} \neq \frac{1i}{\sqrt{3}}$$

$$\frac{-i}{\sqrt{3}} \neq \frac{1i}{\sqrt{3}}$$

$$\frac{-i}{\sqrt{3}} \neq \frac{1i}{\sqrt{3}}$$

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$$\frac{-i}{\sqrt{3}} \neq \frac{1i}{\sqrt{3}}$$

جب $x = 2$ ہے

$$\sqrt{11-x} - \sqrt{6-x} = \sqrt{27-x}$$

$$\sqrt{11-2} - \sqrt{6-2} = \sqrt{27-2}$$

$$\sqrt{9} - \sqrt{4} = \sqrt{25}$$

$$3-2 = 5$$

$$1 \neq 5$$

لہذا $x = 2$ فالٹوررٹ ہے

$$\begin{array}{r} 171 \times 1 \\ 57 \times 3 \\ \hline 19 \times 9 \end{array}$$

$$\begin{array}{r} 171 \times 1 \\ 57 \times 3 \\ \hline 19 \times 9 \end{array}$$

جب $x = 3$ ہے

$$\sqrt{x+1} + \sqrt{x-2} = \sqrt{x+6}$$

$$\sqrt{3+1} + \sqrt{3-2} = \sqrt{3+6}$$

$$\sqrt{4} + \sqrt{1} = \sqrt{9}$$

$$2+1 = 3$$

$$3 = 3$$

S. Set = {3}

Q*8 $\sqrt{4a+x} - \sqrt{a-x} = \sqrt{a}$

طرفین کا مربع لینے سے $(\sqrt{4a+x} - \sqrt{a-x})^2 = (\sqrt{a})^2$

$$(\sqrt{4a+x})^2 + (\sqrt{a-x})^2 - 2(\sqrt{4a+x})(\sqrt{a-x}) = a$$

$$4a+x+a-x-2\sqrt{4a^2-4ax+ax-x^2} = a$$

$$5a-2\sqrt{4a^2-3ax-x^2} = a$$

$$-2\sqrt{4a^2-3ax-x^2} = a-5a$$

$$-2\sqrt{4a^2-3ax-x^2} = -4a$$

$$\sqrt{4a^2-3ax-x^2} = 2a$$

لہذا $x = 3a$

دوبارہ مربع لینے سے $(\sqrt{4a^2 - 3ax - x^2})^2 = 4a^2$

$$4a^2 - 3ax - x^2 = 4a^2$$

$$4a^2 - 4a^2 - 3ax - x^2 = 0$$

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

$$-x(x + 3a) = 0$$

$$-x = 0 \quad \text{or} \quad x + 3a = 0$$

$$x = 0 \quad \text{or} \quad x = -3a$$

جب $x = 0$ ہے

$$\sqrt{4a+x} - \sqrt{a-x} = \sqrt{a}$$

$$\sqrt{4a+0} - \sqrt{a-0} = \sqrt{a}$$

$$\sqrt{4a} - \sqrt{a} = \sqrt{a}$$

$$2\sqrt{a} - \sqrt{a} = \sqrt{a}$$

$$\sqrt{a} = \sqrt{a}$$

لہذا $x = 0$ ہر قسمیں برابری

جب $x = -3a$ ہے

$$\sqrt{4a+x} - \sqrt{a-x} = \sqrt{a}$$

$$\sqrt{4a-3a} - \sqrt{a-(-3a)} = \sqrt{a}$$

$$\sqrt{a} - \sqrt{4a} = \sqrt{a}$$

$$\sqrt{a} - 2\sqrt{a} = \sqrt{a}$$

$$-\sqrt{a} \neq \sqrt{a}$$

لہذا $x = -3a$ کا انٹرویو ہے

لہذا $S \text{ set} = \{0\}$

Q*9 $\sqrt{x^2+x+1} - \sqrt{x^2+x-1} = 1$

$x^2+x = y$ فرض کیا

$$\sqrt{y+1} - \sqrt{y-1} = 1$$

$$(\sqrt{y+1} - \sqrt{y-1})^2 = 1^2$$

طریقہ کار لینے سے

$$(\sqrt{y+1})^2 + (\sqrt{y-1})^2 - 2(\sqrt{y+1})(\sqrt{y-1}) = 1$$

$$y+1 + y-1 - 2\sqrt{y^2-1} = 1$$

$$2y - 2\sqrt{y^2-1} = 1$$

$$-2\sqrt{y^2-1} = 1-2y$$

$$(-2\sqrt{y^2-1})^2 = (1-2y)^2$$

$$4(y^2-1) = 1 + 4y^2 - 4y$$

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

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

$$4y - 5 = 0$$

$$4y = 5$$

$$y = 5/4$$

$$x^2 + x = y$$

$$x^2 + x = \frac{5}{4}$$

$$4x^2 + 4x = 5$$

$$4x^2 + 4x - 5 = 0$$

معیاری صورت سے حوازیہ کرنے سے

$$a=4, b=4, c=-5$$

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

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

$$= \frac{-4 \pm \sqrt{16 + 80}}{8}$$

$$= \frac{-4 \pm \sqrt{96}}{8} = \frac{-4 \pm \sqrt{16 \times 6}}{8}$$

(13) $x = \frac{-4 \pm 4\sqrt{6}}{8} = \frac{-1 \pm \sqrt{6}}{2}$

$$= \frac{-1 \pm \sqrt{6}}{2}$$

جب $x = \frac{-1 \pm \sqrt{6}}{2}$ ہے

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

$$\sqrt{\left(\frac{-1 \pm \sqrt{6}}{2}\right)^2 + \frac{-1 \pm \sqrt{6}}{2} + 1} - \sqrt{\left(\frac{-1 \pm \sqrt{6}}{2}\right)^2 + \frac{-1 \pm \sqrt{6}}{2} - 1} = 1$$

$$\sqrt{\frac{1+6 \pm 2\sqrt{6} + -1 \pm \sqrt{6} + 1}{4}} - \sqrt{\frac{1+6 \pm 2\sqrt{6} + -1 \pm \sqrt{6} - 1}{4}} = 1$$

$$\sqrt{\frac{7 \pm 2\sqrt{6} - 2 \pm 2\sqrt{6} + 1}{4}} - \sqrt{\frac{7 \pm 2\sqrt{6} - 2 \pm 2\sqrt{6} - 1}{4}} = 1$$

$$\sqrt{\frac{9}{4}} - \sqrt{\frac{1}{4}} = 1$$

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

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

$$\frac{2}{2} = 1$$

$$1 = 1$$

لہذا $S \text{ set} = \left\{ \frac{-1 \pm \sqrt{6}}{2} \right\}$

Q*10 $\sqrt{x^2+3x+8} + \sqrt{x^2+3x+2} = 3$

$x^2+3x = y$ فرض کیا

$$\sqrt{y+8} + \sqrt{y+2} = 3$$

طریقہ کار لینے سے

$$(\sqrt{y+8} + \sqrt{y+2})^2 = 3^2$$

$$(\sqrt{y+8})^2 + (\sqrt{y+2})^2 + 2(\sqrt{y+8})(\sqrt{y+2}) = 9$$

$$y+8 + y+2 + 2\sqrt{y^2+2y+8y+16} = 9$$

$$2y+10 + 2\sqrt{y^2+10y+16} = 9$$

$$2\sqrt{y^2+10y+16} = 9 - 2y - 10$$

$$2\sqrt{y^2+10y+16} = -1 - 2y$$

دوبارہ مربع لینے سے

$$(2\sqrt{y^2+10y+16})^2 = (-1-2y)^2 = [-(1+2y)]^2$$

$$4(y^2+10y+16) = 1 + 4y^2 + 4y$$

$$4y^2 + 40y + 64 = 4y^2 + 4y + 1$$

$$4y^2 - 4y^2 + 40y - 4y + 64 - 1 = 0$$

$$36y + 63 = 0$$

$$36y = -63$$

$$y = \frac{-63}{36} = \frac{-7}{4}$$

یہی قیمت درج کرنے سے

$$x^2 + 3x = y = -\frac{7}{4}$$

$$4x^2 + 12x = -7$$

$$4x^2 + 12x + 7 = 0$$

معیاری صورت سے حوازیہ کرنے سے

$$a=4, b=12, c=7$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-12 \pm \sqrt{(12)^2 - 4(4)(7)}}{2(4)}$$

$$x = \frac{-12 \pm \sqrt{144 - 112}}{8} = \frac{-12 \pm \sqrt{32}}{8}$$

$$= \frac{-12 \pm \sqrt{16 \times 2}}{8} = \frac{-12 \pm 4\sqrt{2}}{8}$$

$$x = \frac{4(-3 \pm \sqrt{2})}{8} = \frac{-3 \pm \sqrt{2}}{2}$$

حل 2 جب $x = \frac{-3 \pm \sqrt{2}}{2}$ ہوگی

$$\sqrt{x^2 + 3x + 8} + \sqrt{x^2 + 3x + 2} = 3$$

$$\sqrt{\left(\frac{-3 \pm \sqrt{2}}{2}\right)^2 + 3\left(\frac{-3 \pm \sqrt{2}}{2}\right) + 8} + \sqrt{\left(\frac{-3 \pm \sqrt{2}}{2}\right)^2 + 3\left(\frac{-3 \pm \sqrt{2}}{2}\right) + 2} = 3$$

$$\sqrt{\frac{9 + 2 \pm 6\sqrt{2} - 9 \pm 3\sqrt{2} + 8}{4} + \frac{-9 \pm 3\sqrt{2} + 8}{2}} + \sqrt{\frac{9 + 2 \pm 6\sqrt{2} - 9 \pm 3\sqrt{2} + 2}{4} + \frac{-9 \pm 3\sqrt{2} + 2}{2}} = 3$$

$$\sqrt{\frac{11 \pm 6\sqrt{2} - 18 \pm 6\sqrt{2} + 8}{4}} + \sqrt{\frac{11 \pm 6\sqrt{2} - 18 \pm 6\sqrt{2} + 8}{4}} = 3$$

$$\sqrt{\frac{25}{4}} + \sqrt{\frac{1}{4}} = 3$$

$$\frac{5}{2} + \frac{1}{2} = 3$$

$$\frac{5+1}{2} = 3 \Rightarrow \frac{3}{2} = 3 \Rightarrow 3=3$$

S. Set = $\left\{ \frac{-3 \pm \sqrt{2}}{2} \right\}$

Q*11

$$\sqrt{x^2 + 3x + 9} + \sqrt{x^2 + 3x + 4} = 5$$

$$x^2 + 3x = y$$

$$\sqrt{y+9} + \sqrt{y+4} = 5$$

$$(\sqrt{y+9} + \sqrt{y+4})^2 = 5^2$$

$$(\sqrt{y+9})^2 + (\sqrt{y+4})^2 + 2(\sqrt{y+9})(\sqrt{y+4}) = 25$$

$$y+9 + y+4 + 2\sqrt{y^2 + 4y + 9y + 36} = 25$$

$$2y + 13 + 2\sqrt{y^2 + 13y + 36} = 25$$

$$2\sqrt{y^2 + 13y + 36} = 25 - 2y - 13$$

$$2\sqrt{y^2 + 13y + 36} = 12 - 2y$$

$$\sqrt{y^2 + 13y + 36} = 6 - y$$

$$(\sqrt{y^2 + 13y + 36})^2 = (6 - y)^2$$

$$y^2 + 13y + 36 = 36 + y^2 - 12y$$

$$y^2 + 13y + 36 - 36 - y^2 + 12y = 0$$

$$25y = 0$$

$$y = 0$$

یہ ایک قیمت درج کرنے سے

$$x^2 + 3x = y$$

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

$$x(x+3) = 0$$

$$x = 0 \text{ or } x + 3 = 0$$

$$x = -3$$

(14)

جب $x=0$ ہوگی

حل

$$\sqrt{x^2 + 3x + 9} + \sqrt{x^2 + 3x + 4} = 5$$

$$\sqrt{0 + 3(0) + 9} + \sqrt{0 + 3(0) + 4} = 5$$

$$\sqrt{9} + \sqrt{4} = 5$$

$$3 + 2 = 5$$

$$5 = 5$$

جب $x = -3$ ہوگی

$$\sqrt{x^2 + 3x + 9} + \sqrt{x^2 + 3x + 4} = 5$$

$$\sqrt{(-3)^2 + 3(-3) + 9} + \sqrt{(-3)^2 + 3(-3) + 4} = 5$$

$$\sqrt{9 - 9 + 9} + \sqrt{9 - 9 + 4} = 5$$

$$\sqrt{9} + \sqrt{4} = 5$$

$$3 + 2 = 5$$

$$5 = 5$$

S. Set = $\{0, -3\}$ لیں

مشق 1

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Q*2

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

مساوی صورتوں سے موازنہ کرنے سے

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

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

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

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

$$= \frac{-2 \pm \sqrt{12}}{2}$$

$$= \frac{-2 \pm \sqrt{4 \times 3}}{2}$$

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

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

$$= -1 \pm \sqrt{3}$$

S. Set = $\{-1 \pm \sqrt{3}\}$

(ii) $5x^2 = 15x$

$$5x^2 - 15x = 0$$

$$5x(x-3) = 0$$

$$5x = 0 \text{ or } x-3 = 0$$

$$x = 0 \text{ or } x = 3$$

S. Set = $\{0, 3\}$

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

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

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

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

$$2x = 3x^2 - 48$$

$$3x^2 - 2x - 48 = 0$$

مساوی صورتوں سے

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

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

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

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

$$2x - \frac{1}{2} = \frac{1}{2} \text{ or } 2x - \frac{1}{2} = -\frac{1}{2}$$

$$2x = \frac{1}{2} + \frac{1}{2} \text{ or } 2x = -\frac{1}{2} + \frac{1}{2}$$

$$2x = \frac{2}{2} \text{ or } 2x = \frac{-1+1}{2}$$

$$2x = 1 \text{ or } 2x = 0$$

$$x = \frac{1}{2} \text{ or } x = 0$$