

1) Find the solution set of each of the following equations:

$$\frac{4}{x-1} + \frac{7}{x+7} = \frac{-5}{1-x}$$

$$\text{Sol: } \frac{4}{x-1} + \frac{7}{x+7} = \frac{-5}{-(x-1)}$$

$$\cancel{(x-1)}(x+7)\frac{4}{\cancel{x-1}} + (x-1)\cancel{(x+7)}\frac{7}{\cancel{x+7}} = \cancel{(x-1)}(x+7)\frac{-5}{-\cancel{(x-1)}}$$

$$4x + 28 + 7x - 7 = 5x + 35, \text{ if } x \neq -7, 1$$

$$6x = 14 \Rightarrow x = \frac{7}{3} \text{ (check)} \Rightarrow \text{S.S.} = \left\{ \frac{7}{3} \right\}$$

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

$$\text{Sol: } \left(\sqrt{2-x} \right)^2 = (x-2)^2$$

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

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

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

$$x = 1, 2 \text{ (check)} \Rightarrow \text{S.S.} = \{2\}$$

3) Solve by completing the square

$$3x^2 - 8x + 1 = 0$$

Sol:

$$x^2 - \frac{8}{3}x = -\frac{1}{3}$$

$$x^2 - \frac{8}{3}x + \left(-\frac{4}{3} \right)^2 = -\frac{1}{3} + \frac{16}{9}$$

$$\left(x - \frac{4}{3} \right)^2 = \frac{13}{9}$$

$$x - \frac{4}{3} = \pm \frac{\sqrt{13}}{3}$$

$$x = \frac{4}{3} \pm \frac{\sqrt{13}}{3}$$