Exercise 4.3

1.

(i) $2x^2 - 7x + 3 = 0$

$\Rightarrow 2x^2 - 7x = -3$

Dividing by 2 on both sides we get

$\Rightarrow x^2 - 7x/2 = -3/2$

$\Rightarrow x^2 - 2 \times x \times \frac{7}{4} = -\frac{3}{2}$

On adding $(7/4)^2$ to both sides of equation we ge

$\Rightarrow (x)^2 - 2x \times 7/4 + (7/4)^2 = (7/4)^2 - 3/2$

$\Rightarrow (x - 7/4)^2 = (49/16) - (3/2)$

$\Rightarrow (x - 7/4)^2 = 25/16$

$\Rightarrow (x - 7/4)^2 = \pm 5/4$

$\Rightarrow x = 7/4 + 5/4$ or $x = 7/4 - 5/4$

$\Rightarrow x = 12/4$ or $x = 2/4$

$\Rightarrow x = 3$ or $x = 1/2$

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

$\Rightarrow 2x^2 + x = 4$

Dividing both sides of the equation by 2, we get,

$\Rightarrow x^2 + x/2 = 2$

Now on adding $(1/4)^2$ to both sides of the equation we get,

$\Rightarrow (x)^2 + 2 \times x \times 1/4 + (1/4)^2 = 2 + (1/4)^2$

get

$\Rightarrow (x + 1/4)^2 = 33/16$

$\Rightarrow x + 1/4 = \pm \sqrt{33}/4$

$\Rightarrow x = \pm \sqrt{33}/4 - 1/4$

$\Rightarrow x = \pm \sqrt{33} - 1/4$

Therefore either $x = \sqrt{33} - 1/4$ or $x = \sqrt{3}3 - 1/4$

(iii) $4x^2 + 4\sqrt{3}x + 3 = 0$

Converting the equations into $a^2 + 2ab + b^2$ form we get,

$\Rightarrow (2x)^2 + 2 \times 2x * \sqrt{3} + (\sqrt{3})^2 = 0$

$\Rightarrow (2x + \sqrt{3})^2 = 0$

$\Rightarrow (2x + \sqrt{3}) = 0$ $-3\sqrt{2}$ or $x 3\sqrt{2}$

(iv) $2x^2+x+4=0$

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

Dividing both sides of the equation by 2 we get,

$\Rightarrow x^2+1/2x=2$

$\Rightarrow x^2+2\times x\times 1/4=-2$

By adding $(1/4)^2$ to both sides of the equation we get,

$=(x)^2+2\times x\times 1/4+(1/4)^2=(1/4)^2-2$

$\Rightarrow (x+1/4)^2=1/16-2$

$\Rightarrow (x+1/4)^2=-31/16$

3)

(i) $x-1/x=3,\ x\neq 0$

$\Rightarrow x^2-3x-1=0$

On compairing the given equation with $ax^2+bx+c=0$ we get,

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

$\Rightarrow x = 3 \pm \sqrt{9+4}/2$

$\Rightarrow 2x = 3 \pm \sqrt{13}/2$ or $x = 3 \pm \sqrt{13}/2$

4) Let us say present age of Rehman = x yrs

Three years ago, Rehman's age was $(x-3)$ years

Fifteen years after his age $(x+5)$ years

$\therefore 1/x-3 + 1/x+5 = 1/3$

$\Rightarrow (x+5+x-3)/(x-3)(x+5) = 1/3$

$\Rightarrow (2x+2)/(x-3)(x+5) = 1/3$

$\Rightarrow 3(2x+2) = (x-3)(x+5)$

$\Rightarrow 6x+6 = x^2+2x-15$

$\Rightarrow x^2-4x-21 = 0$

$= x(x-7)+3(x-7) = 0$

$x = 7, (-3)$

5) The marks of Shefali in Maths be x

The marks in English will be $30-x$

ATQ

$$(x+2)(30-x-3)=210$$

$$\Rightarrow (x+2)(27-x)=210$$

$$\Rightarrow -x^2+25x+54=210$$

$$\Rightarrow x^2-25x+156=0$$

$$\Rightarrow x^2-12x-13x+156=0$$

$$\Rightarrow x(x-12)-13(x-12)=0$$

$$\Rightarrow (x-12)(x-13)=0$$

$$\Rightarrow x=12, 13$$

6) The shorter side of the rectangle be x m

Then larger side of the rectangle $=(x+30)$

Therefore,

$$\sqrt{x^2+(x+30)^2}=x+60$$

$$\Rightarrow x^2+x+30^2=(x+60)^2$$

$$x(x-90)+30(x-90)=0$$

$$x=90, -30.$$

7) The larger and smaller number be x and y

$x^2 - y^2 = 180$ and $y^2 = 8x$

$\Rightarrow x^2 - 8x = 180$

$\Rightarrow x^2 - 8x - 180 = 0$

$\Rightarrow x^2 - 18x + 10x - 180 = 0$

$\Rightarrow x(x-18) + 10(x-18) = 0$

$x = 18, -10.$

8) The speed of train be x km/hr

Time taken to cover 360 km: $360/x$ hr

ATQ

$(x+5)(360 - 1/x) = 360$

$\Rightarrow 360 - x + 1800 - 5/x = 360$

$\Rightarrow x^2 + 5x + 10x - 1800 = 0$

$\Rightarrow x(x+45) - 40(x+45) = 0$

$\Rightarrow (x+45)(x-40) = 0$

$x = 40, -45$

10) The average speed of passenger train

$(132/x) - (132/x+11) = 1$

$132(x+11-x)/x(x+11) = 1$

$\Rightarrow x^2 + 44x - 33x - 1452 = 0$

$\Rightarrow x(x+44) - 33(x+44) = 0$

$\Rightarrow (x+44)(x-33) = 0$

$x = -44, 33.$

11) Let the sides of the two squares be x and ym.

Therefore, the perimeter will be, 4x & 4y

$x^2 + y^2 = 468$

$(6+y)^2 + y^2 = 468$

$y(y+18) - 12(y+18) = 0$

$(y+18)(y-12) = 0$

$y = -18, 12$