Exercise 4(C)

Solution 1:

(i) $(x+8)(x+10) = x^2 + (8+10)x + 8 \times 10$
$= x^2 + 18x + 80$

(ii) $(x+8)(x-10) = x^2 + (8-10)x + 8 \times (-10)$
$= x^2 - 2x - 80$

(iii) $(x-8)(x+10) = x^2 - (8-10)x - 8 \times 10$
$= x^2 + 2x - 80$

(iv) $(x-8)(x-10) = x^2 - (8+10)x + 8 \times 10$
$= x^2 - 18x + 80$

(i) $\left(2x - \frac{1}{x}\right)\left(3x + \frac{2}{x}\right) = (2x)(3x) - \left(\frac{1}{x}\right)(3x) + \left(\frac{2}{x}\right)(2x) - \left(\frac{1}{x}\right)\left(\frac{2}{x}\right)$
$= 6x^2 - (3-2) - \frac{2}{x^2}$
$= 6x^2 - (-1) - \frac{2}{x^2}$
$= 6x^2 + 1 - \frac{2}{x^2}$

(ii) $\left(3a + \frac{2}{b}\right)\left(2a - \frac{3}{b}\right) = (3a)(2a) + \left(\frac{2}{b}\right)(2a) - \left(\frac{3}{b}\right)(3a) - \left(\frac{2}{b}\right)\left(\frac{3}{b}\right)$
$= 6a^2 + \left(\frac{4}{b} - \frac{9}{b}\right)a - \frac{6}{b^2}$
$= 6a^2 + \left(-\frac{5}{b}\right)a - \frac{6}{b^2}$
$= 6a^2 - \frac{5a}{b} - \frac{6}{b^2}$

Solution 3:

(i) $(x+y-z)^2 = x^2+y^2+z^2+2(x)(y)-2(y)(z)-2(z)(x)$

$= x^2+y^2+z^2+2xy-2yz-2zx$

(ii) $(x-2y+2)^2 = x^2+(2y)^2+(2)^2-2(x)(2y)-2(2y)(2)+2(2)(x)$

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

(iii) $(5a-3b+c)^2 = (5a)^2+(3b)^2+(c)^2-2(5a)(3b)-2(3b)(c)+2(c)(5a)$

$= 25a^2+9b^2+c^2-30ab-6bc+10ca$

(iv) $(5x-3y-2) = (5x)^2+(3y)^2+(2)^2-2(5x)(3y)+2(3y)(2)-2(2)(5x)$

$= 25x^2+9y^2+4-30xy+12y-20x$

(v) $\left(x-\frac{1}{x}+5\right)^2 = (x)^2+\left(\frac{1}{x}\right)^2+(5)^2-2(x)\left(\frac{1}{x}\right)-2\left(\frac{1}{x}\right)(5)+2(5)(x)$

$= x^2+\frac{1}{x^2}+25-2-\frac{10}{x}+10x$

$= x^2+\frac{1}{x^2}+23-\frac{10}{x}+10x$

Solution 4:

We know that

$(a+b+c)^2 = a^2+b^2+c^2+2(ab+bc+ca)$....(1)

Given that, $a^2+b^2+c^2 = 50$ and a+b+c=12.

We need to find $ab+bc+ca$:

Substitute the values of $(a^2+b^2+c^2)$ and (a+b+c)

in the identity (1), we have

$(12)^2 = 50+2(ab+bc+ca)$

$\Rightarrow 144 = 50+2(ab+bc+ca)$

$\Rightarrow 94 = 2(ab+bc+ca)$

$\Rightarrow ab+bc+ca = \frac{94}{2}$

$\Rightarrow ab+bc+ca = 47$

Solution 5:

We know that

$(a+b+c)^2 = a^2+b^2+c^2+2(ab+bc+ca)$....(1)

Given that, $a^2+b^2+c^2 = 35$ and $ab+bc+ca$=23.

We need to find $a+b+c$:

Substitute the values of $(a^2+b^2+c^2)$ and $(ab+bc+ca)$

in the identity (1), we have

$(a+b+c)^2 = 35+2(23)$

$\Rightarrow (a+b+c)^2 = 81$

$\Rightarrow a+b+c = \pm\sqrt{81}$

$\Rightarrow a+b+c = \pm 9$

We know that

$(a+b+c)^2 = a^2+b^2+c^2+2(ab+bc+ca)$....(1)

Given that, $a+b+c = p$ and $ab+bc+ca=q$.

We need to find $a^2+b^2+c^2$:

Substitute the values of $(ab+bc+ca)$ and $(a+b+c)$ in the identity (1), we have

$(p)^2 = a^2+b^2+c^2+2(q)$

$\Rightarrow p^2 = a^2+b^2+c^2+2q$

$\Rightarrow a^2+b^2+c^2 = p^2-2q$

Solution 7:

$a^2+b^2+c^2 = 50$ and $ab+bc+ca = 47$

Since $(a+b+c)^2 = a^2+b^2+c^2+2(ab+bc+ca)$

$\therefore (a+b+c)^2 = 50+2(47)$

$\Rightarrow (a+b+c)^2 = 50+94 = 144$

$\Rightarrow a+b+c = \sqrt{144} = \pm 12$

$\therefore a+b+c = \pm 12$

Solution 8:

$x+y-z = 4$ and $x^2+y^2+z^2 = 30$

Since $(x+y-z)^2 = x^2+y^2+z^2+2(xy-yz-zx)$, we have

$(4)^2 = 30+2(xy-yz-zx)$

$\Rightarrow 16 = 30+2(xy-yz-zx)$

$\Rightarrow 2(xy-yz-zx) = -14$

$\Rightarrow xy-yz-zx = \frac{-14}{2} = -7$

$\therefore xy-yz-zx = -7$