# Factorisation
# Ex 7C

Q1

**Answer :**

We have:

$$x^2 + 8x + 16 = x^2 + 2 \times x \times 4 + (4)^2$$
$$= (x + 4)^2$$

$$\therefore x^2 + 8x + 16 = (x + 4)^2$$

Q2

**Answer :**

We have:

$$x^2 + 14x + 49 = x^2 + 2 \times x \times 7 + (7)^2$$
$$= (x + 7)^2$$

$$\therefore x^2 + 14x + 49 = (x + 7)^2$$

Q3

**Answer :**

We have:

$$1 + 2x + x^2 = x^2 + 2x + 1$$
$$= x^2 + 2 \times x \times 1 + (1)^2$$
$$= (x + 1)^2$$

$$\therefore 1 + 2x + x^2 = (x + 1)^2$$

Q4

**Answer :**

We have;

$$\begin{aligned} 9+6z+z^2 &= z^2+6z+9 \\ &= z^2+2\times z\times 3+(3)^2 \\ &= (z+3)^2 \end{aligned}$$

$\therefore 9+6z+z^2=(z+3)^2$

Q5

**Answer :**

We have:

$$\begin{aligned} x^2+6ax+9a^2 &= x^2+2\times x\times 3a+(3a)^2 \\ &= (x+3a)^2 \end{aligned}$$

$\therefore x^2+6ax+9a^2=(x+3a)^2$

Q6

**Answer :**

We have:

$$\begin{aligned} 4y^2+20y+25 &= (2y)^2+2\times 2y\times 5+(5)^2 \\ &= (2y+5)^2 \end{aligned}$$

$\therefore 4y^2+20y+25=(2y+5)^2$

Q7

**Answer :**

We have:

$$\begin{aligned} 36a^2+36a+9 &= (6a)^2+2\times 6a\times 3+(3)^2 \\ &= (6a+3)^2 \end{aligned}$$

$\therefore 36a^2+36a+9=(6a+3)^2$

Q8

**Answer :**

We have:

$$\begin{aligned} 9m^2+24m+16 &= (3m)^2+2\times 3m\times 4+(4)^2 \\ &= (3m+4)^2 \end{aligned}$$

$\therefore 9m^2+24m+16=(3m+4)^2$

Q9

**Answer :**

We have:

$$\begin{aligned} z^2+z+\tfrac{1}{4} &= z^2+2\times z\times \tfrac{1}{2}\times\left(\tfrac{1}{2}\right)^2 \\ &= \left(z+\tfrac{1}{2}\right)^2 \end{aligned}$$

$\therefore z^2+z+\frac{1}{4}=\left(z+\frac{1}{2}\right)^2$

Q10

**Answer :**

We have:

$$\begin{aligned} 49a^2+84ab+36b^2 &= (7a)^2+2\times 7a\times 6b+(6b)^2 \\ &= (7a+6b)^2 \end{aligned}$$

$\therefore 49a^2+84ab+36b^2=(7a+6b)^2$

Q11

**Answer :**

We have:

$$\begin{aligned} p^2 - 10p + 25 &= p^2 - 2 \times p \times 5 + (5)^2 \\ &= (p-5)^2 \end{aligned}$$

$$\therefore p^2 - 10p + 25 = (p-5)^2$$

Q12

**Answer :**

We have:

$$\begin{aligned} 121a^2 - 88ab + 16b^2 &= (11a)^2 - 2 \times 11a \times 4b + (4b)^2 \\ &= (11a - 4b)^2 \end{aligned}$$

$$\therefore 121a^2 - 88ab + 16b^2 = (11a - 4b)^2$$

Q13

**Answer :**

We have:

$$\begin{aligned} 1 - 6x + 9x^2 &= 9x^2 - 6x + 1 \\ &= (3x)^2 - 2 \times 3x \times 1 + (1)^2 \\ &= (3x - 1)^2 \end{aligned}$$

$$\therefore 1 - 6x + 9x^2 = (3x - 1)^2$$

Q14

**Answer :**

We have:

$$\begin{aligned} 9y^2 - 12y + 4 &= (3y)^2 - 2 \times 3y \times 2 + (2)^2 \\ &= (3y - 2)^2 \end{aligned}$$

$$\therefore 9y^2 - 12y + 4 = (3y - 2)^2$$

Q15

**Answer :**

We have:

$$\begin{aligned} 16x^2 - 24x + 9 &= (4x)^2 - 2 \times 4x \times 3 + (3)^2 \\ &= (4x - 3)^2 \end{aligned}$$

$$\therefore 16x^2 - 24x + 9 = (4x - 3)^2$$

Q16

**Answer :**

We have:

$$\begin{aligned} m^2 - 4mn + 4n^2 &= m^2 - 2 \times m \times 2n + (2n)^2 \\ &= (m - 2n)^2 \end{aligned}$$

$$\therefore m^2 - 4mn + 4n^2 = (m - 2n)^2$$

Q17

**Answer :**

We have:

$$\begin{aligned} a^2b^2 - 6abc + 9c^2 &= (ab)^2 - 2 \times ab \times 3c + (3c)^2 \\ &= (ab - 3c)^2 \end{aligned}$$

Q18

**Answer :**

We have:

$$\begin{aligned} m^4 + 2m^2n^2 + n^4 &= (m^2)^2 + 2 \times m^2 \times n^2 + (n^2)^2 \\ &= (m^2 + n^2)^2 \end{aligned}$$

$$\therefore m^4 + 2m^2n^2 + n^4 = (m^2 + n^2)^2$$

Q19

**Answer :**

We have:

$$\begin{aligned} (l+m)^2 - 4lm &= \left(l^2 + m^2 + 2lm\right) - 4lm \\ &= l^2 + m^2 + 2lm - 4lm \\ &= l^2 + m^2 - 2lm \\ &= (l)^2 + (m)^2 - 2 \times l \times m \\ &= (l-m)^2 \end{aligned}$$

$$\therefore (l+m)^2 - 4lm = (l-m)^2$$