Factorizations Ex 7.9 Q6

Answer:

$a^2 - 14a - 51$

$= a^2 - 14a + \left(\frac{14}{2}\right)^2 - \left(\frac{14}{2}\right)^2 - 51$ $\quad \left[\text{Adding and subtracting } \left(\frac{14}{2}\right)^2, \text{ that is, } 7^2\right]$

$= a^2 - 14a + 7^2 - 7^2 - 51$

$= \left(a - 7\right)^2 - 100$ $\quad \left[\text{Completing the square}\right]$

$= \left(a - 7\right)^2 - 10^2$

$= \left[\left(a - 7\right) - 10\right]\left[\left(a - 7\right) + 10\right]$

$= \left(a - 7 - 10\right)\left(a - 7 + 10\right)$

$= \left(a - 17\right)\left(a + 3\right)$

Factorizations Ex 7.9 Q7

Answer:

$a^2 + 2a - 3$

$= a^2 + 2a + \left(\frac{2}{2}\right)^2 - \left(\frac{2}{2}\right)^2 - 3$ $\quad \left[\text{Adding and subtracting } \left(\frac{2}{2}\right)^2, \text{ that is, } 1^2\right]$

$= a^2 + 2a + 1^2 - 1^2 - 3$

$= \left(a + 1\right)^2 - 4$ $\quad \left[\text{Completing the square}\right]$

$= \left(a + 1\right)^2 - 2^2$

$= \left[\left(a + 1\right) - 2\right]\left[\left(a + 1\right) + 2\right]$

$= \left(a + 1 - 2\right)\left(a + 1 + 2\right)$

$= \left(a - 1\right)\left(a + 3\right)$

Factorizations Ex 7.9 Q8

Answer :

$$4x^2 - 12x + 5$$

$$= 4\left(x^2 - 3x + \frac{5}{4}\right) \qquad \left[Making\ the\ coefficient\ of\ x^2 = 1\right]$$

$$= 4\left[x^2 - 3x + \left(\frac{3}{2}\right)^2 - \left(\frac{3}{2}\right)^2 + \frac{5}{4}\right] \qquad \left[Adding\ and\ subtracting\ \left(\frac{3}{2}\right)^2\right]$$

$$= 4\left[\left(x - \frac{3}{2}\right)^2 - \frac{9}{4} + \frac{5}{4}\right] \qquad \left[Completing\ the\ square\right]$$

$$= 4\left[\left(x - \frac{3}{2}\right)^2 - 1^2\right]$$

$$= 4\left[\left(x - \frac{3}{2}\right) - 1\right]\left[\left(x - \frac{3}{2}\right) + 1\right]$$

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

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

$$= \left(2x - 5\right)\left(2x - 1\right)$$

Factorizations Ex 7.9 Q9

Answer :

$$y^2 - 7y + 12$$

$$= y^2 - 7y + \left(\frac{7}{2}\right)^2 - \left(\frac{7}{2}\right)^2 + 12 \qquad \left[Adding\ and\ subtracting\ \left(\frac{7}{2}\right)^2\right]$$

$$= \left(y - \frac{7}{2}\right)^2 - \frac{49}{4} + \frac{48}{4} \qquad \left[Completing\ the\ square\right]$$

$$= \left(y - \frac{7}{2}\right)^2 - \frac{1}{4}$$

$$= \left(y - \frac{7}{2}\right)^2 - \left(\frac{1}{2}\right)^2$$

$$= \left[\left(y - \frac{7}{2}\right) - \frac{1}{2}\right]\left[\left(y - \frac{7}{2}\right) + \frac{1}{2}\right]$$

$$= \left(y - \frac{7}{2} - \frac{1}{2}\right)\left(y - \frac{7}{2} + \frac{1}{2}\right)$$

$$= \left(y - 4\right)\left(y - 3\right)$$

Factorizations Ex 7.9 Q10

Answer :

$$z^2 - 4z - 12$$

$$= z^2 - 4z + \left(\frac{4}{2}\right)^2 - \left(\frac{4}{2}\right)^2 - 12 \qquad \left[Adding\ and\ subtracting\ \left(\frac{4}{2}\right)^2,\ that\ is,\ 2^2\right]$$

$$= z^2 - 4z + 2^2 - 2^2 - 12$$

$$= \left(z - 2\right)^2 - 16 \qquad \left[Completing\ the\ square\right]$$

$$= \left(z - 2\right)^2 - 4^2$$

$$= \left[\left(z - 2\right) - 4\right]\left[\left(z - 2\right) + 4\right]$$

$$= \left(z - 6\right)\left(z + 2\right)$$

*********** END *********