Factorizations Ex 7.9 Q1

Answer :

$$p^2+6p+8$$
$$=p^2+6p+\left(\frac{6}{2}\right)^2-\left(\frac{6}{2}\right)^2+8 \quad \left[\text{Adding and subtracting } \left(\frac{6}{2}\right)^2, \text{ that is, } 3^2\right]$$
$$=p^2+6p+3^2-3^2+8$$
$$=p^2+2\times p\times 3+3^2-9+8$$
$$=p^2+2\times p\times 3+3^2-1$$
$$=\left(p+3\right)^2-1^2 \quad \left[\text{Completing the square}\right]$$
$$=\left[\left(p+3\right)-1\right]\left[\left(p+3\right)+1\right]$$
$$=\left(p+3-1\right)\left(p+3+1\right)$$
$$=\left(p+2\right)\left(p+4\right)$$

Factorizations Ex 7.9 Q2

Answer :

$$q^2-10q+21$$
$$=q^2-10q+\left(\frac{10}{2}\right)^2-\left(\frac{10}{2}\right)^2+21 \quad \left[\text{Adding and subtracting } \left(\frac{10}{2}\right)^2, \text{ that is, } 5^2\right]$$
$$=q^2-2\times q\times 5+5^2-5^2+21$$
$$=\left(q-5\right)^2-4 \quad \left[\text{Completing the square}\right]$$
$$=\left(q-5\right)^2-2^2$$
$$=\left[\left(q-5\right)-2\right]\left[\left(q-5\right)+2\right]$$
$$=\left(q-5-2\right)\left(q-5+2\right)$$
$$=\left(q-7\right)\left(q-3\right)$$

Factorizations Ex 7.9 Q3

Answer :

$$4y^2+12y+5$$
$$=4\left(y^2+3y+\frac{5}{4}\right) \quad \left[\textit{Making the coefficient of } y^2=1\right]$$
$$=4\left[y^2+3y+\left(\frac{3}{2}\right)^2-\left(\frac{3}{2}\right)^2+\frac{5}{4}\right] \quad \left[\textit{Adding and subtracting } \left(\frac{3}{2}\right)^2\right]$$
$$=4\left[\left(y+\frac{3}{2}\right)^2-\frac{9}{4}+\frac{5}{4}\right]$$
$$=4\left[\left(y+\frac{3}{2}\right)^2-1^2\right] \quad \left[\textit{Completing the square}\right]$$
$$=4\left[\left(y+\frac{3}{2}\right)-1\right]\left[\left(y+\frac{3}{2}\right)+1\right]$$
$$=4\left(y+\frac{3}{2}-1\right)\left(y+\frac{3}{2}+1\right)$$
$$=4\left(y+\frac{1}{2}\right)\left(y+\frac{5}{2}\right)$$
$$=\left(2y+1\right)\left(2y+5\right)$$

Factorizations Ex 7.9 Q4

Answer :

$$p^2+6p-16$$
$$=p^2+6p+\left(\frac{6}{2}\right)^2-\left(\frac{6}{2}\right)^2-16 \quad \left[\text{Adding and subtracting } \left(\frac{6}{2}\right)^2, \text{ that is, } 3^2\right]$$
$$=p^2+6p+3^2-9-16$$
$$=\left(p+3\right)^2-25 \quad \left[\text{Completing the square}\right]$$
$$=\left(p+3\right)^2-5^2$$
$$=\left[\left(p+3\right)-5\right]\left[\left(p+3\right)+5\right]$$
$$=\left(p+3-5\right)\left(p+3+5\right)$$
$$=\left(p-2\right)\left(p+8\right)$$

Factorizations Ex 7.9 Q5

Answer :

$$x^2+12x+20$$
$$=x^2+12x+\left(\frac{12}{2}\right)^2-\left(\frac{12}{2}\right)^2+20 \quad \left[\textit{Adding and subtracting } \left(\frac{12}{2}\right)^2, \textit{ that is, } 6^2\right]$$
$$=x^2+12x+6^2-6^2+20$$
$$=\left(x+6\right)^2-16 \quad \left[\textit{Completing the square}\right]$$
$$=\left(x+6\right)^2-4^2$$
$$=\left[\left(x+6\right)-4\right]\left[\left(x+6\right)+4\right]$$
$$=\left(x+6-4\right)\left(x+6+4\right)$$
$$=\left(x+2\right)\left(x+10\right)$$

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