

Expansion Formulae

Practice set 5.1

Q. 1. A. Expand.

$$(a + 2)(a - 1)$$

$$\text{Answer : } (a + 2)(a - 1) = a^2 + [(2) + (-1)] a + [(2) \times (-1)]$$

$$\{ \because (x + p)(x + q) = x^2 + (p + q)x + (p \times q) \}$$

$$\text{Here } x = a, p = 2, q = -1 \}$$

$$= a^2 + (2 - 1)a + (-2)$$

$$= a^2 + 2a - a - 2$$

$$= a^2 + a - 2$$

Q. 1. B. Expand.

$$(m - 4)(m + 6)$$

$$\text{Answer : } (m - 4)(m + 6) = m^2 + [(-4) + (6)] m + [(-4) \times (6)]$$

$$\{ \because (x + p)(x + q) = x^2 + (p + q)x + (p \times q) \}$$

$$= m^2 + (6 - 4)m + (-24)$$

$$= m^2 + 6m - 4m - 24$$

$$= m^2 + 2m - 24$$

Q. 1. C. Expand.

$$(p + 8)(p - 3)$$

$$\text{Answer : } (p + 8)(p - 3) = p^2 + [(8) + (-3)] p + [(8) \times (-3)]$$

$$\{ \because (x + a)(x + b) = x^2 + (a + b)x + (a \times b) \}$$

$$= p^2 + (8 - 3)p + (-24)$$

$$= p^2 + 8p - 3p - 24$$

$$= p^2 + 5p - 24$$

Q. 1. D. Expand.

$$(13 + x)(13 - x)$$

$$\text{Answer : } (13 + x)(13 - x) = (13)^2 - (x)^2$$

$$\{ \because (a + b)(a - b) = (a)^2 - (b)^2 \}$$

$$= 169 - x^2$$

Q. 1. E. Expand.

$$(3x + 4y)(3x + 5y)$$

$$\text{Answer : } (3x + 4y)(3x + 5y) = (3x)^2 + [(4y) + (5y)] 3x + [(4y) \times (5y)]$$

$$\{ \because (x + a)(x + b) = x^2 + (a + b)x + (a \times b) \}$$

$$= 9x^2 + [(9y) \times (3x)] + 20y^2$$

$$= 9x^2 + 27xy + 20y^2$$

Q. 1. F. Expand.

$$(9x - 5l)(9x + 3l)$$

$$\text{Answer : } (9x - 5l)(9x + 3l) = (9x)^2 + [(- 5l) + (3l)] 9x + [(- 5l) \times (3l)]$$

$$\{ \because (x + a)(x + b) = x^2 + (a + b)x + (a \times b) \}$$

$$= 81x^2 + [(- 2l) \times (9x)] + (- 15l^2)$$

$$= 81x^2 - 18xl - 15l^2$$

Q. 1. G. Expand.

$$\left(m + \frac{2}{3} \right) \left(m - \frac{7}{3} \right)$$

Answer :

$$\left(m + \frac{2}{3}\right)\left(m - \frac{7}{3}\right) = (m)^2 + \left(\frac{2}{3} + \left(-\frac{7}{3}\right)\right)m + \left(\frac{2}{3} \times \left(-\frac{7}{3}\right)\right)$$

$$\{\because (x + a)(x + b) = x^2 + (a + b)x + (a \times b)\}$$

$$= m^2 + \left(\frac{2}{3} - \frac{7}{3}\right)m + \left(-\frac{14}{9}\right)$$

$$= m^2 + \left(-\frac{5}{3}\right)m - \frac{14}{9}$$

$$= m^2 - \frac{5}{3}m - \frac{14}{9}$$

Q. 1. H. Expand.

$$\left(x + \frac{1}{x}\right)\left(x - \frac{1}{x}\right)$$

Answer :

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

$$\{\because (a + b)(a - b) = (a)^2 - (b)^2\}$$

$$= x^2 - \frac{1}{x^2}$$

Q. 1. I. Expand.

$$\left(\frac{1}{y} + 4\right)\left(\frac{1}{y} - 9\right)$$

Answer :

$$\left(\frac{1}{y} + 4\right)\left(\frac{1}{y} - 9\right) = \left(\frac{1}{y}\right)^2 + [(4) + (-9)] \times \left(\frac{1}{y}\right) + [4 \times (-9)]$$

$$= \left(\frac{1}{y}\right)^2 + \left(-\frac{5}{y}\right) - 36$$

$$= \frac{1}{y^2} - \frac{5}{y} - 36$$

Practice set 5.2

Q. 1. A. Expand

$$(k + 4)^3$$

$$\text{Answer : } (k + 4)^3 = (k)^3 + [3 \times (k)^2 \times (4)] + [3 \times (k) \times (4)^2] + (4)^3$$

$$\{ \because (a + b)^3 = a^3 + 3a^2b + 3ab^2 + b^3 \}$$

$$\text{Here } a = k, b = 4 \}$$

$$= k^3 + (3 \times 4)k^2 + (3 \times 16)k + 64$$

$$= k^3 + 12k^2 + 48k + 64$$

Q. 1. B. Expand

$$(7x + 8y)^3$$

$$\text{Answer : } (7x + 8y)^3 = (7x)^3 + [3 \times (7x)^2 \times (8y)] + [3 \times (7x) \times (8y)^2] + (8y)^3$$

$$\{ \because (a + b)^3 = a^3 + 3a^2b + 3ab^2 + b^3 \}$$

$$= 343x^3 + (3 \times 49 \times 8)x^2y + (3 \times 7 \times 64)xy^2 + 512y^3$$

$$= 343x^3 + 1176x^2y + 1344xy^2 + 512y^3$$

Q. 1. C. Expand

$$(7 + m)^3$$

$$\text{Answer : } (7 + m)^3 = (7)^3 + [3 \times (7)^2 \times (m)] + [3 \times (7) \times (m)^2] + (m)^3$$

$$\{ \because (a + b)^3 = a^3 + 3a^2b + 3ab^2 + b^3 \}$$

$$= 343 + (3 \times 49)m + (3 \times 7)m^2 + m^3$$

$$= 343 + 147m + 21m^2 + m^3$$

Q. 1. D. Expand

$$(52)^3$$

$$\text{Answer : } (52)^3 = (50 + 2)^3$$

$$(50 + 2)^3 = (50)^3 + [3 \times (50)^2 \times (2)] + [3 \times (50) \times (2)^2] + (2)^3$$

$$\{ \because (a + b)^3 = a^3 + 3a^2b + 3ab^2 + b^3 \}$$

$$= 125000 + (3 \times 2500 \times 2) + (3 \times 50 \times 4) + 8$$

$$= 125000 + 15000 + 600 + 8$$

$$= 140608$$

Q. 1. E. Expand

$$(101)^3$$

$$\text{Answer : } (101)^3 = (100 + 1)^3$$

$$(100 + 1)^3 = (100)^3 + [3 \times (100)^2 \times (1)] + [3 \times (100) \times (1)^2] + (1)^3$$

$$\{ \because (a + b)^3 = a^3 + 3a^2b + 3ab^2 + b^3 \}$$

$$= 1000000 + (3 \times 10000 \times 1) + (3 \times 100 \times 1) + 1$$

$$= 1000000 + 30000 + 300 + 1$$

$$= 1030301$$

Q. 1. F. Expand

$$\left(x + \frac{1}{x} \right)^3$$

Answer :

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

$$\{\because (a + b)^3 = a^3 + 3a^2b + 3ab^2 + b^3\}$$

$$= x^3 + 3x + \frac{3}{x} + \frac{1}{x^3}$$

Q. 1. G. Expand

$$\left(2m + \frac{1}{5}\right)^3$$

Answer :

$$\left(2m + \frac{1}{5}\right)^3 = (2m)^3 + \left[3 \times (2m)^2 \times \left(\frac{1}{5}\right)\right] + \left[3 \times (2m) \times \left(\frac{1}{5}\right)^2\right] + \left(\frac{1}{5}\right)^3$$

$$\{\because (a + b)^3 = a^3 + 3a^2b + 3ab^2 + b^3\}$$

$$= 8m^3 + \left[3 \times 4m^2 \times \left(\frac{1}{5}\right)\right] + \left[3 \times (2m) \times \frac{1}{25}\right] + \frac{1}{125}$$

$$= 8m^3 + \frac{12m^2}{5} + \frac{6m}{25} + \frac{1}{125}$$

Q. 1. H. Expand

$$\left(\frac{5x}{y} + \frac{y}{5x}\right)^3$$

Answer :

$$\left(\frac{5x}{y} + \frac{y}{5x}\right)^3 = \left(\frac{5x}{y}\right)^3 + \left[3 \times \left(\frac{5x}{y}\right)^2 \times \left(\frac{y}{5x}\right)\right] + \left[3 \times \left(\frac{5x}{y}\right) \times \left(\frac{y}{5x}\right)^2\right] + \left(\frac{y}{5x}\right)^3$$

$$\{\because (a + b)^3 = a^3 + 3a^2b + 3ab^2 + b^3\}$$

$$= \frac{125x^3}{y^3} + \left[3 \times \frac{25x^2}{y^2} \times \left(\frac{y}{5x}\right)\right] + \left[3 \times \left(\frac{5x}{y}\right) \times \frac{y^2}{25x^2}\right] + \frac{y^3}{125x^3}$$

$$= \frac{125x^3}{y^3} + \frac{15x}{y} + \frac{3y}{5x} + \frac{y^3}{125x^3}$$

Practice set 5.3

Q. 1. A. Expand

$$(2m - 5)^3$$

$$\text{Answer : } (2m - 5)^3 = (2m)^3 - [3 \times (2m)^2 \times 5] + [3 \times (2m) \times (5)^2] - (5)^3$$

$$\{ \because (a - b)^3 = a^3 - 3a^2b + 3ab^2 - b^3$$

$$\text{Here } a = 2m, b = -5 \}$$

$$= 8m^3 - [3 \times 4m^2 \times 5] + [3 \times 2m \times 25] - 125$$

$$= 8m^3 - 60m^2 + 150m - 125$$

Q. 1. B. Expand

$$(4 - p)^3$$

$$\text{Answer : } (4 - p)^3 = (4)^3 - [3 \times (4)^2 \times p] + [3 \times (4) \times (p)^2] - (p)^3$$

$$\{ \because (a - b)^3 = a^3 - 3a^2b + 3ab^2 - b^3 \}$$

$$= 64 - [3 \times 16 \times p] + [3 \times 4 \times p^2] - p^3$$

$$= 64 - 48p + 12p^2 - p^3$$

Q. 1. C. Expand

$$(7x - 9y)^3$$

$$\text{Answer : } (7x - 9y)^3 = (7x)^3 - [3 \times (7x)^2 \times 9y] + [3 \times (7x) \times (9y)^2] - (9y)^3$$

$$\{ \because (a - b)^3 = a^3 - 3a^2b + 3ab^2 - b^3 \}$$

$$= 343x^3 - [3 \times 49x^2 \times 9y] + [3 \times 7x \times 81y^2] - 729y^3$$

$$= 343x^3 - 1323x^2y + 1701xy^2 - 729y^3$$

Q. 1. D. Expand

$$(58)^3$$

Answer : $(58)^3 = (60 - 2)^3$

$$(60 - 2)^3 = (60)^3 - [3 \times (60)^2 \times 2] + [3 \times (60) \times (2)^2] - (2)^3$$

$$\{\because (a - b)^3 = a^3 - 3a^2b + 3ab^2 - b^3\}$$

$$= 216000 - [3 \times 3600 \times 2] + [3 \times 60 \times 4] - 8$$

$$= 216000 - 21600 + 720 - 8$$

$$= 195112$$

Q. 1. E. Expand

$$(198)^3$$

Answer : $(198)^3 = (200 - 2)^3$

$$(200 - 2)^3 = (200)^3 - [3 \times (200)^2 \times 2] + [3 \times (200) \times (2)^2] - (2)^3$$

$$\{\because (a - b)^3 = a^3 - 3a^2b + 3ab^2 - b^3\}$$

$$= 8000000 - 240000 + 2400 - 8$$

$$= 7762392$$

Q. 1. F. Expand

$$\left(2p - \frac{1}{2p}\right)^3$$

Answer :

$$\left(2p - \frac{1}{2p}\right)^3 = (2p)^3 - \left[3 \times (2p)^2 \times \left(\frac{1}{2p}\right)\right] + \left[3 \times (2p) \times \left(\frac{1}{2p}\right)^2\right] - \left(\frac{1}{2p}\right)^3$$

$$\{\because (a - b)^3 = a^3 - 3a^2b + 3ab^2 - b^3\}$$

$$= 8p^3 - 6p + \frac{3}{2p} - \frac{1}{8p^3}$$

Q. 1. G. Expand

$$\left(1 - \frac{1}{a}\right)^3$$

Answer :

$$\left(1 - \frac{1}{a}\right)^3 = (1)^3 - \left[3 \times (1)^2 \times \left(\frac{1}{a}\right)\right] + \left[3 \times (1) \times \left(\frac{1}{a}\right)^2\right] - \left(\frac{1}{a}\right)^3$$

$$\{\because (a - b)^3 = a^3 - 3a^2b + 3ab^2 - b^3\}$$

$$= 1 - \frac{3}{a} + \frac{3}{a^2} - \frac{1}{a^3}$$

Q. 1. H. Expand

$$\left(\frac{x}{3} - \frac{3}{x}\right)^3$$

Answer :

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

$$\{\because (a - b)^3 = a^3 - 3a^2b + 3ab^2 - b^3\}$$

$$= \frac{x^3}{27} - x + \frac{9}{x} - \frac{27}{x^3}$$

Q. 2. A. Simplify

$$(2a + b)^3 - (2a - b)^3$$

$$\text{Answer : } (2a + b)^3 - (2a - b)^3 = [(2a)^3 + \{3 \times (2a)^2 \times b\} + \{3 \times (2a) \times (b)^2\} + (b)^3] - [(2a)^3 - \{3 \times (2a)^2 \times b\} + \{3 \times (2a) \times (b)^2\} - (b)^3]$$

$$\begin{aligned}
& \{ \because (a + b)^3 = a^3 + 3a^2b + 3ab^2 + b^3 \text{ and } (a - b)^3 = a^3 - 3a^2b + 3ab^2 - b^3 \} \\
& = [8a^3 + \{ 3 \times 4a^2 \times b \} + \{ 3 \times 2a \times b \} + b^3] - [8a^3 - \{ 3 \times 4a^2 \times b \} + \{ 3 \times 2a \times b^2 \} - b^3] \\
& = [8a^3 + 12a^2b + 6ab^2 + b^3] - [8a^3 - 12a^2b + 6ab^2 - b^3] \\
& = 8a^3 + 12a^2b + 6ab^2 + b^3 - 8a^3 + 12a^2b - 6ab^2 + b^3 \\
& = 24a^2b + 2b^3
\end{aligned}$$

Q. 2. B. Simplify

$$(3r - 2k)^3 + (3r + 2k)^3$$

$$\text{Answer : } (3r - 2k)^3 + (3r + 2k)^3 = [(3r)^3 - \{ 3 \times (3r)^2 \times (2k) \} + \{ 3 \times (3r) \times (2k)^2 \} - (2k)^3] + [(3r)^3 + \{ 3 \times (3r)^2 \times (2k) \} + \{ 3 \times (3r) \times (2k)^2 \} + (2k)^3]$$

$$\begin{aligned}
& \{ \because (a + b)^3 = a^3 + 3a^2b + 3ab^2 + b^3 \text{ and } (a - b)^3 = a^3 - 3a^2b + 3ab^2 - b^3 \} \\
& = [27r^3 - \{ 3 \times 9r^2 \times 2k \} + \{ 3 \times 3r \times 4k^2 \} - 8k^3] + [27r^3 + \{ 3 \times 9r^2 \times 2k \} + \{ 3 \times 3r \times 4k^2 \} + 8k^3] \\
& = [27r^3 - 54r^2k + 36rk^2 - 8k^3] + [27r^3 + 54r^2k + 36rk^2 + 8k^3] \\
& = 27r^3 - 54r^2k + 36rk^2 - 8k^3 + 27r^3 + 54r^2k + 36rk^2 + 8k^3 \\
& = 54r^3 + 72rk^2
\end{aligned}$$

Q. 2. C. Simplify

$$(4a - 3)^3 - (4a + 3)^3$$

$$\text{Answer : } (4a - 3)^3 - (4a + 3)^3 = [(4a)^3 - \{ 3 \times (4a)^2 \times 3 \} + \{ 3 \times (4a) \times (3)^2 \} - (3)^3] - [(4a)^3 + \{ 3 \times (4a)^2 \times 3 \} + \{ 3 \times (4a) \times (3)^2 \} + (3)^3]$$

$$\begin{aligned}
& \{ \because (a + b)^3 = a^3 + 3a^2b + 3ab^2 + b^3 \text{ and } (a - b)^3 = a^3 - 3a^2b + 3ab^2 - b^3 \} \\
& = [64a^3 - \{ 3 \times 16a^2 \times 3 \} + \{ 3 \times 4a \times 9 \} - 27] - [64a^3 + \{ 3 \times 16a^2 \times 3 \} + \{ 3 \times 4a \times 9 \} + 27] \\
& = [64a^3 - 144a^2 + 108a - 27] - [64a^3 + 144a^2 + 108a + 27] \\
& = 64a^3 - 144a^2 + 108a - 27 - 64a^3 - 144a^2 - 108a - 27 \\
& = - 288a^2 - 54
\end{aligned}$$

Q. 2. D. Simplify

$$(5x - 7y)^3 + (5x + 7y)^3$$

$$\text{Answer : } (5x - 7y)^3 + (5x + 7y)^3 = [(5x)^3 - \{3 \times (5x)^2 \times (7y)\} + \{3 \times (5x) \times (7y)^2\} - (7y)^3] + [(5x)^3 + \{3 \times (5x)^2 \times (7y)\} + \{3 \times (5x) \times (7y)^2\} + (7y)^3]$$

$$\{\therefore (a + b)^3 = a^3 + 3a^2b + 3ab^2 + b^3 \text{ and } (a - b)^3 = a^3 - 3a^2b + 3ab^2 - b^3\}$$

$$= [125x^3 - \{3 \times 25x^2 \times 7y\} + \{3 \times 5x \times 49y^2\} - 343y^3] + [125x^3 + \{3 \times 25x^2 \times 7y\} + \{3 \times 5x \times 49y^2\} + 343y^3]$$

$$= [125x^3 - 525x^2y + 735xy^2 - 343y^3] + [125x^3 + 525x^2y + 735xy^2 + 343y^3]$$

$$= 125x^3 - 525x^2y + 735xy^2 - 343y^3 + 125x^3 + 525x^2y + 735xy^2 + 343y^3$$

$$= 250x^3 + 1470xy^2$$

Practice set 5.4**Q. 1. A. Expand**

$$(2p + q + 5)^2$$

$$\text{Answer : } (2p + q + 5)^2 = (2p)^2 + (q)^2 + (5)^2 + [2 \times (2p) \times (q)] + [2 \times (q) \times (5)] + [2 \times (2p) \times (5)]$$

$$\{\therefore (a + b + c)^2 = a^2 + b^2 + c^2 + 2ab + 2bc + 2ac\}$$

$$\text{Here } a = 2p, b = q, c = 5 \}$$

$$= 4p^2 + q^2 + 25 + [4pq] + [10q] + [20p]$$

$$= 4p^2 + q^2 + 25 + 4pq + 10q + 20p$$

Q. 1. B. Expand

$$(m + 2n + 3r)^2$$

$$\text{Answer : } (m + 2n + 3r)^2 = (m)^2 + (2n)^2 + (3r)^2 + [2 \times (m) \times (2n)] + [2 \times (2n) \times (3r)] + [2 \times (m) \times (3r)]$$

$$\{\therefore (a + b + c)^2 = a^2 + b^2 + c^2 + 2ab + 2bc + 2ac\}$$

$$= m^2 + 4n^2 + 9r^2 + [4mn] + [12nr] + [6mr]$$

$$= m^2 + 4n^2 + 9r^2 + 4mn + 12nr + 6mr$$

Q. 1. C. Expand

$$(3x + 4y - 5p)^2$$

Answer : $(3x + 4y - 5p)^2 = (3x)^2 + (4y)^2 + (-5p)^2 + [2 \times (3x) \times (4y)] + [2 \times (4y) \times (-5p)] + [2 \times (3x) \times (-5p)]$

$$\{ \because (a + b + c)^2 = a^2 + b^2 + c^2 + 2ab + 2bc + 2ac \}$$

$$= 9x^2 + 16y^2 + 25p^2 + [24xy] + [-40yp] + [-30xp]$$

$$= 9x^2 + 16y^2 + 25p^2 + 24xy - 40yp - 30xp$$

Q. 1. D. Expand

$$(7m - 3n - 4k)^2$$

Answer : $(7m - 3n - 4k)^2 = (7m)^2 + (-3n)^2 + (-4k)^2 + [2 \times (7m) \times (-3n)] + [2 \times (-3n) \times (-4k)] + [2 \times (7m) \times (-4k)]$

$$\{ \because (a + b + c)^2 = a^2 + b^2 + c^2 + 2ab + 2bc + 2ac \}$$

$$= 49m^2 + 9n^2 + 16k^2 + [-42mn] + [24nk] + [-56mk]$$

$$= 49m^2 + 9n^2 + 16k^2 - 42mn + 24nk - 56mk$$

Q. 2. A. Simplify

$$(x - 2y + 3)^2 + (x + 2y - 3)^2$$

Answer : $(x - 2y + 3)^2 + (x + 2y - 3)^2 = [(x)^2 + (-2y)^2 + (3)^2 + \{2 \times (x) \times (-2y)\} + \{2 \times (-2y) \times (3)\} + \{2 \times (x) \times (3)\}] + [(x)^2 + (2y)^2 + (-3)^2 + \{2 \times (x) \times (2y)\} + \{2 \times (2y) \times (-3)\} + \{2 \times (x) \times (-3)\}]$

$$\{ \because (a + b + c)^2 = a^2 + b^2 + c^2 + 2ab + 2bc + 2ac \}$$

$$= [x^2 + 4y^2 + 9 + \{-4xy\} + \{-12y\} + \{6x\}] + [x^2 + 4y^2 + 9 + \{4xy\} + \{-12y\} + \{-6x\}]$$

$$= [x^2 + 4y^2 + 9 - 4xy - 12y + 6x] + [x^2 + 4y^2 + 9 + 4xy - 12y - 6x]$$

$$= x^2 + 4y^2 + 9 - 4xy - 12y + 6x + x^2 + 4y^2 + 9 + 4xy - 12y - 6x$$

$$= 2x^2 + 8y^2 + 18 - 24y$$

Q. 2. B. Simplify

$$(3k - 4r - 2m)^2 - (3k + 4r - 2m)^2$$

$$\text{Answer : } (3k - 4r - 2m)^2 - (3k + 4r - 2m)^2 = [(3k)^2 + (-4r)^2 + (-2m)^2 + \{2 \times (3k) \times (-4r)\} + \{2 \times (-4r) \times (-2m)\} + \{2 \times (3k) \times (-2m)\}] - [(3k)^2 + (4r)^2 + (-2m)^2 + \{2 \times (3k) \times (4r)\} + \{2 \times (4r) \times (-2m)\} + \{2 \times (3k) \times (-2m)\}]$$

$$\{\therefore (a + b + c)^2 = a^2 + b^2 + c^2 + 2ab + 2bc + 2ac\}$$

$$= [9k^2 + 16r^2 + 4m^2 + \{-24kr\} + \{16rm\} + \{-12km\}] - [9k^2 + 16r^2 + 4m^2 + \{24kr\} + \{-16rm\} + \{-12km\}]$$

$$= [9k^2 + 16r^2 + 4m^2 - 24kr + 16rm - 12km] - [9k^2 + 16r^2 + 4m^2 + 24kr - 16rm - 12km]$$

$$= 9k^2 + 16r^2 + 4m^2 - 24kr + 16rm - 12km - 9k^2 - 16r^2 - 4m^2 - 24kr + 16rm + 12km$$

$$= -48kr + 32rm$$

$$= 32rm - 48kr$$

Q. 2. C. Simplify

$$(7a - 6b + 5c)^2 + (7a + 6b - 5c)^2$$

$$\text{Answer : } (7a - 6b + 5c)^2 + (7a + 6b - 5c)^2 = [(7a)^2 + (-6b)^2 + (5c)^2 + \{2 \times (7a) \times (-6b)\} + \{2 \times (-6b) \times (5c)\} + \{2 \times (7a) \times (5c)\}] + [(7a)^2 + (6b)^2 + (-5c)^2 + \{2 \times (7a) \times (6b)\} + \{2 \times (6b) \times (-5c)\} + \{2 \times (7a) \times (-5c)\}]$$

$$\{\therefore (a + b + c)^2 = a^2 + b^2 + c^2 + 2ab + 2bc + 2ac\}$$

$$= [49a^2 + 36b^2 + 25c^2 + \{-84ab\} + \{-60bc\} + \{70ac\}] + [49a^2 + 36b^2 + 25c^2 + \{84ab\} + \{-60bc\} + \{-70ac\}]$$

$$= [49a^2 + 36b^2 + 25c^2 - 84ab - 60bc + 70ac] + [49a^2 + 36b^2 + 25c^2 + 84ab - 60bc - 70ac]$$

$$= 49a^2 + 36b^2 + 25c^2 - 84ab - 60bc + 70ac + 49a^2 + 36b^2 + 25c^2 + 84ab - 60bc - 70ac$$

$$= 98a^2 + 72b^2 + 50c^2 - 120bc$$