Expansion Formulae

Practice set 5.1

Q. 1. A. Expand.

(a + 2)(a – 1)

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

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

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)

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)

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.

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

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.

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

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.

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

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 :

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

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

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

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

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

Q. 1. H. Expand.

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

Answer :

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

{∵ $(a + b)(a – b) = (a)^2 – (b)^2$}

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

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

$(k + 4)^3$

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

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

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

$(7x + 8y)^3$

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

$(7 + m)^3$

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

$(52)^3$

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

$(101)^3$

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 :

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

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

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

Q. 1. G. Expand

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

Answer :

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

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

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

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

Q. 1. H. Expand

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

Answer :

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

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

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

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

Practice set 5.3

Q. 1. A. Expand

$(2m - 5)^3$

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

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

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

$(4 - p)^3$

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

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

$= 64 - [3 \times 6 \times p] + [3 \times 4 \times p^2] - p^3$

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

Q. 1. C. Expand

$(7x - 9y)^3$

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 :

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

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

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

Q. 1. H. Expand

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

Answer :

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

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

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

Q. 2. A. Simplify

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

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

{∵$(a + b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$ and$(a – b)^3 = a^3 – 3a^2b + 3ab^2 – b^3$ }

= [$8a^3$ +{3 × $4a^2$× b } +{3 × 2a ×b } + b^3] – [$8a^3$ – { 3 × $4a^2$× b } +{3 × 2a × b^2 }– b^3]

= [$8a^3 + 12a^2b + 6ab^2 + b^3$] – [$8a^3 – 12a^2b + 6ab^2 – b^3$]

= $8a^3 + 12a^2b + 6ab^2 + b^3 – 8a^3 + 12a^2b – 6ab^2 + b^3$

= $24a^2b + 2b^3$

Q. 2. B. Simplify

$(3r – 2k)^3 +(3r + 2k)^3$

Answer : $(3r – 2k)^3 +(3r + 2k)^3$ = [$(3r)^3$ -{3 ×$(3r)^2$ ×(2k)} + {3 ×(3r)×$(2k)^2$ } -$(2k)^3$] + [$(3r)^3$ +{3 × $(3r)^2$ ×(2k)} + {3 ×(3r)×$(2k)^2$} +$(2k)^3$]

{ ∵$(a + b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$ and$(a – b)^3 = a^3 – 3a^2b + 3ab^2 – b^3$}

= [$27r^3$ –{3 × $9r^2$ × 2k } + {3 × 3r × $4k^2$ } – $8k^3$] + [$27r^3$ +{3 × $9r^2$ × 2k } +{3 ×3r ×($4k^2$ } + $8k^3$]

= [$27r^3 – 54r^2k + 36rk^2 – 8k^3$] + [$27r^3 + 54r^2k + 36rk^2 + 8k^3$]

= $27r^3$ - $54r^2k + 36rk^2 – 8k^3 + 27r^3 + 54r^2k + 36rk^2 + 8k^3$

= $54r^3 + 72rk^2$

Q. 2. C. Simplify

$(4a – 3)^3 –(4a + 3)^3$

Answer : $(4a – 3)^3 –(4a + 3)^3$ = [$(4a)^3$ -{3 ×$(4a)^2$ × 3 } + { 3 ×(4a)×$(3)^2$ } -$(3)^3$] - [$(4a)^3$ +{3 × $(4a)^2$ × 3 } +{3 ×(4a)×$(3)^2$ } +$(3)^3$]

{ ∵$(a + b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$ and $(a – b)^3 = a^3 –3a^2b + 3ab^2 – b^3$ }

= [$64a^3$-{3 × $16a^2$ × 3 } +{3 × 4a × 9} - 27] – [$64a^3$ +{3 × $16a^2$ × 3 } +{3 × 4a × 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

Q. 2. D. Simplify

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

$= [x^2 + 4y^2 + 9 – 4xy – 12y + 6x] + [x2 + 4y^2 + 9 + 4xy – 12y – 6x]$

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

$= 2x^2 + 8y^2 + 18 – 24y$

Q. 2. B. Simplify

$(3k – 4r – 2m)^2 -(3k + 4r – 2m)^2$

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

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

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

$= [9k^2 + 16r^2 + 4m^2 – 24kr + 16rm – 12km] - [9k2 + 16r^2 + 4m^2 + 24kr – 16rm – 12km]$

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

$= - 48kr + 32rm$

$= 32rm – 48kr$

Q. 2. C. Simplify

$(7a – 6b + 5c)^2 +(7a + 6b – 5c)^2$

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

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

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

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

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

$= 98a^2 + 72b^2 + 50c^2 – 120bc$