

Exercise 8.2 (Revised) - Chapter 9 - Algebraic Expressions & Identities - Ncert Solutions class 8 - Maths

Updated On 11-02-2025 By Lithanya

Chapter 8 - Algebraic Expressions & Identities - NCERT Solutions for Class 8 Maths

Ex 8.2 Question 1.

Find the product of the following pairs of monomials:

(i) $4, 7p$

(ii) $-4p, 7p$

(iii) $-4p, 7pq$

(iv) $4p^3 = -3p$

(iv) $4p, 0$

Answer.

(i) $4 \times 7p = 4 \times 7 \times p = 28p$

(ii) $-4p \times 7p = (-4 \times 7) \times (p \times p)$
 $= -28p^2$

(iii) $-4p \times 7pq = (-4 \times 7)(p \times pq)$
 $= -28p^2q$

(iv) $4p^3 \times -3p = (4 \times -3)(p^3 \times p)$
 $= -12p^4$

(v) $4p \times 0 = (4 \times 0)(p) = 0$

Ex 8.2 Question 2.

Find the areas of rectangles with the following pairs of monomials as their lengths

and breadths respectively:

$(p, q); (10m, 5n); (20x^2, 5y^2); (4x, 3x^2); (3mn, 4np)$

Answer.

(i) Area of rectangle

$= \text{length} \times \text{breadth}$

$= p \times q = pq \text{ sq. units}$

(ii) Area of rectangle

$= \text{length} \times \text{breadth}$

$= 10m \times 5n = (10 \times 5)(m \times n)$

$= 50mn \text{ sq. units}$

(iii) Area of rectangle = length $\times$ breadth

$= 20x^2 \times 5y^2 = (20 \times 5)(x^2 \times y^2)$

$= 100x^2y^2 \text{ sq. units}$

(iv) Area of rectangle = length $\times$ breadth



$$\begin{aligned}
 &= 4x \times 3x^2 = (4 \times 3) (x \times x^2) \\
 &= 12x^3 \text{ sq. units} \\
 \text{(v) Area of rectangle} &= \text{length} \times \text{readth} \\
 &= 3mn \times 4np = (3 \times 4)(mn \times np) \\
 &= 12mn^2p \text{ sq. units}
 \end{aligned}$$

Ex 8.2 Question 3.

Complete the table of products:

(i)

First monomial →						
Second monomial ↓	$2x$	$-5y$	$3x^2$	$-4xy$	$7x^2y$	$-9x^2y^2$
$2x$	$4x^2$	.....	.....	.....	.....	.....
$-5y$			$-15x^2y$	.....	.....	.....
$3x^2$						
$-4xy$						
$7x^2y$						
$-9x^2y^2$						

Answer.

(i)

First monomial →						
Second monomial ↓	$2x$	$-5y$	$3x^2$	$-4xy$	$7x^2y$	$-9x^2y^2$
$2x$	$4x^2$	$-10xy$	$6x^3$	$-8x^2y$	$14x^3y$	$-18x^3y^2$
$-5y$	$-10xy$	$25y^2$	$-15x^2y$	$20xy^2$	$-35x^3y^2$	$45x^3y^3$
$3x^2$	$6x^3$	$-15x^2y$	$9x^4$	$-12x^3y$	$21x^4y$	$-27x^4y^2$
$-4xy$	$8x^2y$	$20xy^2$	$-12x^3y$	$16x^2y^2$	$-28x^3y^2$	$36x^3y^3$
$7x^2y$	$14x^3y$	$-35x^2y^2$	$21x^4y$	$-28x^3y^2$	$49x^4y^2$	$-63x^4y^3$
$-9x^2y^2$	$-18x^3y^2$	$45x^2y^3$	$-27x^4y^2$	$36x^3y^3$	$-63x^4y^3$	$81x^4y^4$

Ex 8.2 Question 4.

Obtain the volume of rectangular boxes with the following length, breadth and height respectively:

(i) $5a, 3a^2, 7a^4$

(ii) $2p, 4q, 8r$

(iii) $xy, 2x^2y, 2xy^2$

(iv) $a, 2b, 3c$

Answer.

(i) Volume of rectangular box

$$\begin{aligned}
 &= \text{length} \times \text{breadth} \times \text{height} \\
 &= 5a \times 3a^2 \times 7a^4 = (5 \times 3 \times 7) (a \times a^2 \times a^4) \\
 &= 105a^7 \text{ cubic units}
 \end{aligned}$$

(ii) Volume of rectangular box

$$\begin{aligned}
 &= \text{length} \times \text{breadth} \times \text{height} \\
 &= 2p \times 4q \times 8r = (2 \times 4 \times 8)(p \times q \times r) \\
 &= 64pqr \text{ cubic units}
 \end{aligned}$$

(iii) Volume of rectangular box

$$\begin{aligned}
 &= \text{length} \times \text{breadth} \times \text{height} \\
 &= xy \times 2x^2y \times 2xy^2 \\
 &= (1 \times 2 \times 2) (x \times x^2 \times x \times y \times y \times y^2)
 \end{aligned}$$

(iii) $xy, 2x^2y, 2xy^2$

(iv) $a, 2b, 3c$

Answer.

(i) Volume of rectangular box

$$\begin{aligned}
 &= \text{length} \times \text{breadth} \times \text{height} \\
 &= 5a \times 3a^2 \times 7a^4 = (5 \times 3 \times 7) (a \times a^2 \times a^4) \\
 &= 105a^7 \text{ cubic units}
 \end{aligned}$$

(ii) Volume of rectangular box

$$\begin{aligned}
 &= \text{length} \times \text{breadth} \times \text{height} \\
 &= 2p \times 4q \times 8r = (2 \times 4 \times 8)(p \times q \times r) \\
 &= 64pqr \text{ cubic units}
 \end{aligned}$$

(iii) Volume of rectangular box

$$\begin{aligned}
 &= \text{length} \times \text{breadth} \times \text{height} \\
 &= xy \times 2x^2y \times 2xy^2 \\
 &= (1 \times 2 \times 2)(x \times x^2 \times x \times y \times y \times y^2)
 \end{aligned}$$

$$= 4x^4y^4 \text{ cubic units}$$

(iv) Volume of rectangular box

$$\begin{aligned}
 &= \text{length} \times \text{readth} \times \text{height} \\
 &= a \times 2b \times 3c = (1 \times 2 \times 3)(a \times b \times c) \\
 &= 6abc \text{ cubic units}
 \end{aligned}$$

Ex 8.2 Question 5.

Obtain the product of:

(i) xy, yz, zx

(ii) $a = -a^2, a^3$

(iii) $2, 4y, 8y^2, 16y^3$

(iv) $a, 2b, 3c, 6abc$

(v) $m_2 - mn_2mnp$

Answer.

(i) $xy \times yz \times zx = x \times x \times y \times y \times z \times z$
 $= x^2y^2z^2$

(ii) $a \times (-a^2) \times a^3 = (-1)(a \times a^2 \times a^3)$
 $= -a^6$

(iii) $2 \times 4y \times 8y^2 \times 16y^3$
 $= (2 \times 4 \times 8 \times 16)(y \times y^2 \times y^3)$
 $= 1024y^6$

(iv) $a \times 2b \times 3c \times 6abc$
 $= (1 \times 2 \times 3 \times 6)(a \times b \times c \times abc)$
 $= 36a^2b^2c^2$

(v) $m \times -mn \times mnp = (-1)(m \times m \times m \times n \times n \times p)$
 $= -m^3n^2p$

Exercise 8.3 (Revised) - Chapter 9 - Algebraic Expressions & Identities - Ncert Solutions class 8 - Maths

Updated On 11-02-2025 By Lithanya

Chapter 8 - Algebraic Expressions & Identities - NCERT Solutions for Class 8 Maths

Ex 8.3 Question 1.

Carry out the multiplication of the expressions in each of the following pairs:

- (i) $4p : q + r$
- (ii) $ab, a - b$
- (iii) $a + b, 7a^2b^2$
- (iv) $a^2 - 9 = 4a$
- (v) $pq + qr + rp = 0$

Answer.

- (i) $4p \times (q + \gamma) = 4p \times q + 4p \times \gamma$
 $= 4pq + 4pr$
- (ii) $ab \times (a - b) = ab \times a - ab \times b$
 $= a^2b - ab^2$
- (iii) $(a + b) \times 7a^2b^2 = a \times 7a^2b^2 + b \times 7a^2b^2 = 7a^3b^2 + 7a^2b^3$
- (iv) $(a^2 - 9) \times 4a = a^2 \times 4a - 4a \times 9 = 4a^3 - 36a$
- (v) $(pq + qr + rp) \times 0 = pq \times 0 + qr \times 0 + rp \times 0$
 $= 0 + 0 + 0 = 0$

Ex 8.3 Question 2.

Complete the table:

	First expression	Second expression	Product
(i)	a	$b + c + d$	.....
(ii)	$x + y - 5$	$5xy$	.....
(iii)	p	$6p^2 - 7p + 5$	.....
(iv)	$4p^2q^2$	$p^2 - q^2$	.....
(v)	$a + b + c$	abc	.....

Answer:

	First expression	Second expression	Product
(i)	a	$b + c + d$	$a(b + c + d)$ $= a \times b + a \times c + a \times d$ $= ab + ac + ad$
(ii)	$x + y - 5$	$5xy$	$5xy(x + y - 5)$ $= 5xy \times x + 5xy \times y - 5xy \times 5$ $= 5x^2y + 5xy^2 - 25xy$
(iii)	p	$6p^2 - 7p + 5$	$p(6p^2 - 7p + 5)$ $= p \times 6p^2 - p \times 7p + p \times 5$ $= 6p^3 - 7p^2 + 5p$
(iv)	$4p^2q^2$	$p^2 - q^2$	$4p^2q^2(p^2 - q^2)$ $= 4p^2q^2 \times p^2 - 4p^2q^2 \times q^2$ $= 4p^4q^2 - 4p^2q^4$
(v)	$a + b + c$	abc	$abc(a + b + c)$ $= abc \times a + abc \times b + abc \times c$ $= a^2bc + ab^2c + abc^2$

Ex 8.3 Question 3.

Find the product:

- (i) $(a^2) \times (2a^{22}) \times (4a^{26})$
- (ii) $\left(\frac{2}{3}xy\right) \times \left(\frac{-9}{10}x^2y^2\right)$
- (iii) $\left(\frac{-10}{3}pq^3\right) \times \left(\frac{6}{5}p^3q\right)$
- (iv) $x \times x^2 \times x^3 \times x^4$

Answer.

- (i) $(a^2) \times (2a^{22}) \times (4a^{26})$
 $= (2 \times 4) (a^2 \times a^{22} \times a^{25})$
 $= 8 \times a^{2+22+26} = 8a^{50}$
- (ii) $\left(\frac{2}{3}xy\right) \times \left(\frac{-9}{10}x^2y^2\right)$
 $= \left(\frac{2}{3} \times \frac{-9}{10}\right) (x \times x^2 \times y \times y^2)$
 $= \frac{-3}{5}x^3y^3$
- (iii) $\left(\frac{-10}{3}pq^3\right) \times \left(\frac{6}{5}p^3q\right)$
 $= \left(\frac{-10}{3} \times \frac{6}{5}\right) (p \times p^3 \times q^3 \times q)$
 $= -4p^4q^4$

- (iv) $x \times x^2 \times x^3 \times x^4 = x^{1+2+3+4} = x^{10}$

Ex 8.3 Question 4.

- (a) Simplify: $3x(4x - 5) + 3$ and find values for
 - (i) $x = 3$
 - (ii) $x = \frac{1}{2}$
- (b) Simplify: $a(a^2 + a + 1) + 5$ and find its value for
 - (i) $a = 0$
 - (ii) $a = 1$
 - (iii) $a = -1$.

Answer.

- (a) $3x(4x - 5) + 3$
 $= 3x \times 4x - 3x \times 5 + 3$
 $= 12x^2 - 15x + 3$
- (i) For $x = 3, 12x^2 + 15x + 3$
 $= 12(3)^2 - 15 \times 3 + 3$
 $= 12 \times 9 - 45 + 3 = 108 - 45 + 3 = 66$
- (ii) For $x = \frac{1}{2} = 12x^2 - 15x + 3$
 $= 12\left(\frac{1}{2}\right)^2 - 15 \times \frac{1}{2} + 3$
 $= 12 \times \frac{1}{4} - \frac{15}{2} + 3$

$$= 6 - \frac{15}{2} = \frac{12 - 15}{2} = \frac{-3}{2}$$

$$(b) a(a^2 + a + 1) + 5$$

$$= a \times a^2 + a \times a + a \times 1 + 5$$

$$= a^3 + a^2 + a + 5$$

$$(i) \text{ For } a = 0 : a^3 + a^2 + a + 5$$

$$= (0)^3 + (0)^2 + (0) + 5$$

$$= 0 + 0 + 0 + 5 = 5$$

$$(ii) \text{ For } a = 1 : a^3 + a^2 + a + 5$$

$$= (1)^3 + (1)^2 + (1) + 5$$

$$= 1 + 1 + 1 + 5 = 8$$

$$(ii) \text{ For } a = 1 : a^3 + a^2 + a + 5$$

$$= (1)^3 + (1)^2 + (1) + 5$$

$$= 1 + 1 + 1 + 5 = 8$$

$$(iii) \text{ For } a = -1 : a^3 + a^2 + a + 5$$

$$= (-1)^3 + (-1)^2 + (-1) + 5$$

$$= -1 + 1 - 1 + 5 = -2 + 6 = 4$$

Ex 8.3 Question 5.

(a) Add: $p(p - q)$, $q(q - r)$ and $\mu(\mu - p)$.

(b) Add: $2x(z - x - y)$ and $2y(z - y - zx)$.

(c) Subtract: $3l(l - 4m + 5n)$ from $4l(10n - 3m + 2l)$.

(d) Subtract: $3a(a + b + c) - 2b(a - b + c)$ from $4c(-a + b + c)$.

Answer.

$$(a) p(p - q) + q(q - r) + \mu(\mu - p)$$

$$= p^2 - pq + q^2 - qr + r^2 - rp$$

$$= p^2 + q^2 + r^2 - pq - qr - rp$$

$$(b) 2x(z - x - y) + 2y(z - y - x)$$

$$= 2xz - 2x^2 - 2xy + 2yz - 2y^2 - 2xy$$

$$= 2xz - 2xy - 2xy + 2yz - 2x^2 - 2y^2$$

$$= -2x^2 - 2y^2 - 4xy + 2yz + 2zx$$

$$(c) 4l(10n - 3m + 2l) - 3l(l - 4m + 5n)$$

$$= 40ln - 12lm + 8l^2 - 3l^2 + 12lm - 15ln$$

$$= 8l^2 - 3l^2 - 12lm + 12m + 40ln - 15m$$

$$= 5l^2 + 25ln$$

$$(d) 4c(-a + b + c) - [3a(a + b + c) - 2b(a - b + c)]$$

$$= -4ac + 4bc + 4c^2 - [3a^2 + 3ab + 3ac - 2ab + 2b^2 - 2bc]$$

$$= -4ac + 4bc + 4c^2 - [3a^2 + 2b^2 + 3ab - 2bc + 3ac - 2ab]$$

$$= -4ac + 4bc + 4c^2 - [3a^2 + 2b^2 + ab + 3ac - 2bc]$$

$$= -4ac + 4bc + 4c^2 - 3a^2 - 2b^2 - ab - 3ac + 2bc$$

$$= -3a^2 - 2b^2 + 4c^2 - ab + 4bc + 2bc - 4ac - 3ac$$

$$= -3a^2 - 2b^2 + 4c^2 - ab + 6bc - 7ac$$

Exercise 8.4 (Revised) - Chapter 9 - Algebraic Expressions & Identities - Ncert Solutions class 8 - Maths

Updated On 11-02-2025 By Lithanya

Chapter 8 - Algebraic Expressions & Identities - NCERT Solutions for Class 8 Maths

Ex 8.4 Question 1. Multiply the binomials:

(i) $(2x + 5)$ and $(4x - 3)$

(ii) $(y - 8)$ and $(3y - 4)$

(iii) $(2.5l - 0.5m)$ and $(2.5l + 0.5m)$

(iv) $(a + 3b)$ and $(x + 5)$

(v) $(2pq + 3q^2)$ and $(3pq - 2q^2)$

(vi) $\left(\frac{3}{4}a^2 + 3b^2\right)$ and $4\left(a^2 - \frac{2}{3}b^2\right)$

Answer.

$$\begin{aligned} & (2x + 5) \times (4x - 3) \\ &= 2x(4x - 3) + 5(4x - 3) \end{aligned}$$

$$\begin{aligned} \text{(i)} \quad &= 2x \times 4x - 2x \times 3 + 5 \times 4x - 5 \times 3 \\ &= 8x^2 - 6x + 20x - 15 \\ &= 8x^2 + 14x - 15 \end{aligned}$$

$$= 8x^2 + 14x - 15$$

$$\begin{aligned} \text{(ii)} \quad & (y - 8) \times (3y - 4) = y(3y - 4) - 8(3y - 4) \\ &= y \times 3y - y \times 4 - 8 \times 3y - 8 \times -4 \end{aligned}$$

$$= 3y^2 - 4y - 24y + 32$$

$$= 3y^2 - 28y + 32$$

$$\begin{aligned} \text{(iii)} \quad & (2.5l - 0.5m) \times (2.5l + 0.5m) \\ &= 2.5l \times (2.5l + 0.5m) - 0.5m \times (2.5l + 0.5m) \end{aligned}$$

$$= 2.5l \times 2.5l + 2.5l \times 0.5m - 0.5m \times 2.5l - 0.5m \times 0.5m$$

$$= 6.25l^2 + 1.25lm - 1.25lm - 0.25m^2$$

$$= 6.25l^2 - 0.25m^2$$

$$\text{(iv)} \quad (a + 3b) \times (x + 5) = a(x + 5) + 3b(x + 5)$$

$$= a \times x + a \times 5 + 3b \times x + 3b \times 5$$

$$= ax + 5a + 3bx + 15b$$

$$\text{(v)} \quad (2pq + 3q^2)(3pq - 2q^2)$$

$$= 2pq \times (3pq - 2q^2) + 3q^2(3pq - 2q^2)$$

$$= 2pq \times 3pq - 2pq \times 2q^2 + 3q^2 \times 3pq - 3q^2 \times 2q^2$$

$$= 6p^2q^2 - 4pq^3 + 9pq^3 - 6q^4$$



$$\begin{aligned}
&= 6p^2q^2 + 5pq^3 - 6q^4 \\
\text{(vi)} \quad &\left(\frac{3}{4}a^2 + 3b^2\right) \times 4\left(a^2 - \frac{2}{3}b^2\right) \\
&= \left(\frac{3}{4}a^2 + 3b^2\right) \times \left(4a^2 - \frac{8}{3}b^2\right) \\
&= \frac{3}{4}a^2 \times \left(4a^2 - \frac{8}{3}b^2\right) + 3b^2 \times \left(4a^2 - \frac{8}{3}b^2\right) \\
&= \frac{3}{4}a^2 \times 4a^2 - \frac{3}{4}a^2 \times \frac{8}{3}b^2 + 3b^2 \times 4a^2 - 3b^2 \times \frac{8}{3}b^2 \\
&= 3a^4 - 2a^2b^2 + 12a^2b^2 - 8b^4 \\
&= 3a^4 + 10a^2b^2 - 8b^4
\end{aligned}$$

Ex 8.4 Question 2.

Find the product:

- (i) $(5 - 2x)(3 + x)$
(ii) $(x + 7y)(7x - y)$
(iii) $(a^2 + b)(a + b^2)$
(iv) $(p^2 - q^2)(2p + q)$

Answer.

$$\begin{aligned}
\text{(i)} \quad &(5 - 2x)(3 + x) \\
&= 5 \times (3 + x) - 2x(3 + x) \\
&= 5 \times 3 + 5 \times x - 2 \times 3 - 2x \times x \\
&= 15 + 5x - 6x - 2x^2 = 15 - x - 2x^2 \\
\text{(ii)} \quad &(x + 7y)(7x - y) \\
&= x(7x - y) + 7y \times (7x - y) \\
&= x \times 7x - x \times y + 7y \times 7x - 7y \times y \\
&= 7x^2 - xy + 49xy - 7y^2 \\
&= 7x^2 + 48xy - 7y^2 \\
\text{(iii)} \quad &(a^2 + b)(a + b^2) \\
&= a^2 \times (a + b^2) + b \times (a + b^2) \\
&= a^2 \times a + a^2 \times b^2 + b \times a + b \times b^2 \\
&= a^3 + a^2b^2 + ab + b^3 \\
&\quad (p^2 - q^2)(2p + q) \\
\text{(iv)} \quad &= p^2 \times (2p + q) - q^2(2p + q) \\
&= p^2 \times 2p + p^2 \times q - q^2 \times 2p - q^2 \times q \\
&= 2p^3 + p^2q - 2pq^2 - q^3
\end{aligned}$$

Ex 8.4 Question 3.

Simplify:

- (i) $(x^2 - 5)(x + 5) + 25$
(ii) $(a^2 + 5)(b^2 + 3) + 5$
(iii) $(t + s^2)(t^2 - s)$
(iv) $(a + b)(c - d) + (a - b)(c + d) + 2(ac + bd)$
(v) $(x + y)(2x + y) + (x + 2y)(x - y)$
(vi) $(x + y)(x^2 - xy + y^2)$
(vii) $(1.5x - 4y)(1.5x + 4y + 3) - 4.5x + 12y$
(viii) $(a + b + c)(a + b - c)$

Answer.

$$\begin{aligned}
\text{(i)} \quad &(x^2 - 5)(x + 5) + 25 \\
&= x^2(x + 5) - 5(x + 5) + 25
\end{aligned}$$

$$= x^2 \times x + x^2 \times 5 - 5 \times x - 5 \times 5 + 25$$

$$= x^3 + 5x^2 - 5x - 25 + 25$$

$$= x^3 + 5x^2 - 5x$$

$$\text{(ii)} \quad (a^2 + 5)(b^3 + 3) + 5$$

$$= a^2(b^3 + 3) + 5(b^3 + 3) + 5$$

$$= a^2 \times b^3 + a^2 \times 3 + 5 \times b^3 + 5 \times 3 + 5$$

$$= a^2b^3 + 3a^2 + 5b^3 + 15 + 5$$

$$= a^2b^3 + 3a^2 + 5b^3 + 20$$

$$\text{(iii)} \quad (t + s^2)(t^2 - s) = t(t^2 - s) + s^2(t^2 - s)$$

$$= t \times t^2 - t \times s + s^2 \times t^2 - s^2 \times s$$

$$= t^3 - st + s^2t^2 - s^3$$

$$\text{(iv)} \quad (a + b)(c - d) + (a - b)(c + d) + 2(ac + bd)$$

$$= a(c - d) + b(c - d) + a(c + d) - b(c + d) + 2ac + 2bd$$

$$= ac - ad + bc - bd + ac + ad - bc - bd + 2ac + 2bd$$

$$= ac + ac - ad + ad + bc - bc - bd - bd + 2ac + 2bd$$

$$= 2ac - 2bd + 2ac + 2bd$$

$$= 4ac$$

$$\text{(v)} \quad (x + y)(2x + y) + (x + 2y)(x - y)$$

$$= x(2x + y) + y(2x + y) + x(x - y) + 2y(x - y)$$

$$= 2x^2 + xy + 2xy + y^2 + x^2 - xy + 2xy - 2y^2$$

$$= 2x^2 + x^2 + xy + 2xy - xy + 2xy + y^2 - 2y^2$$

$$= 3x^2 + 4xy - y^2$$

$$\text{(vi)} \quad (x + y)(x^2 - xy + y^2)$$

$$= x(x^2 - xy + y^2) + y(x^2 - xy + y^2)$$

$$= x^3 - x^2y + xy^2 + x^2y - xy^2 + y^3$$

$$= x^3 - x^2y + x^2y + xy^2 - xy^2 + y^3$$

$$= x^3 + y^3$$

$$\text{(vii)} \quad (1.5x - 4y)(1.5x + 4y + 3) - 4.5x + 12y$$

$$= 1.5x(1.5x + 4y + 3) - 4y(1.5x + 4y + 3) - 4.5x + 12y$$

$$= 2.25x^2 + 6.0xy + 4.5x - 6.0xy - 16y^2 - 12y - 4.5x + 12y$$

$$= 2.25x^2 + 6.0xy - 6.0xy + 4.5x - 4.5x - 16y^2 - 12y + 12y$$

$$= 2.25x^2 - 16y^2$$

$$\text{(viii)} \quad (a + b + c)(a + b - c)$$

$$= a(a + b - c) + b(a + b - c) + c(a + b - c)$$

$$= a^2 + ab - ac + ab + b^2 - bc + ac + bc - c^2$$

$$= a^2 + ab + ab - ac + ac - bc + bc + b^2 - c^2$$

$$= a^2 + b^2 - c^2 + 2ab$$