



MATHS

NCERT - NCERT Maths(Hinglish)

ALGEBRAIC EXPRESSIONS AND IDENTITIES

Exercise 9 2

1. 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) $a, 2b, 3c$



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2. 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) $m, -mn, mnp$

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3. Find the product of the following pairs of monomials. (i) $4, 7p$ (ii) $-4p, 7p$ (iii) $-4p, 7pq$ (iv) $4p^3, -3p$ (v) $4p, 0$

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4. Find the areas of rectangles with the following pairs of monomials as their lengths and breadths respectively (p, q) ; $(10m, 5n)$; $(20x^2, 5y^2)$; $(4x, 3x^2)$; $(3mn, 4np)$

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5. Complete the table of products.

$\frac{\text{First monomial}}{\text{second monomial}}$	$2x$	$-5y$	$-3x^2$	$-4xy$	$7x^2y$	$-9x^2y^2$
$2x$
$-5y$
$-3x^2$
$-4xy$
$7x^2y$
$-9x^2y^2$



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Solved Examples

1. Simplify the expressions and evaluate them as directed:

(i) $x(x - 3) + 2$ for $x = 1$

(ii) $3y(2y - 7) - 3(y - 4) - 63$ for $y = 2$



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2. Multiply

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

(ii) $(x - y)$ and $(3x + 5y)$



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3. Multiply

(i) $(a + 7)$ and $(b - 5)$

(ii) $(a^2 + 2b^2)$ and $(5a - 3b)$



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4. Add: $7xy + 5yz - 3zx$, $4yz + 9zx - 4y$, $-3xz + 5x - 2xy$



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5. Add

(i) $5m(3 - m)$ and $6m^2 - 13m - 13m$

(ii) $4y(3y^2 + 5y - 7)$ and $2(y^3 - 4y^2 + 5)$



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6. Subtract $3pq(p - q)$ from $2pq(p + q)$

A. $-3p^2q + 5pq^2$

B. $-p^2q + 5pq^2$

C. $-p^2q + 5p^2q^2$

D. $p^2q - 5pq^2$

Answer: B



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7. Subtract $5x^2 - 4y^2 + 6y - 3$ from $7x^2 - 4xy + 8y^2 + 5x - 3y$.



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8. Complete the table for area of a rectangle with given length and breadth.



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9. Find the volume of each rectangular box with given length, breadth and height.

	length	breadth	height
(i)	$2ax$	$3by$	$5cz$
(ii)	m^2n	n^2p	p^2m
(iii)	$2q$	$4q^2$	$8q^3$



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10. Using the Identity find

(i) $(2x + 3y)^2$ (ii) 103^2



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11. Simplify $(a + b)(2a - 3b + c) - (2a - 3b)c$.



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12. Using Identity find

(i) $\left(\frac{3m}{2} + \frac{2n}{3}\right)\left(\frac{3m}{2} - \frac{2n}{3}\right)$ (ii) $983^2 - 17^2$ (iii) 194×206



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13. Using Identity find

(i) $(4p - 3q)^2$

(ii) $(49)^2$

A. (i) $19p^2 + 9q^2 - 24pq$

(ii) 2481

B. (i) $16p^2 + 9q^2 - 24pq$

(ii) 2401

C. (i) $6p^2 + 8q^2 - 24pq$

(ii) 2501

D. (i) $10p^2 + 9q^2 - 24pq$

(ii) 2401

Answer: B

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Exercise 9 1

1. (i) $15a^4b^2 - 20a^3b^3 + 30a^2b^4$ (ii) $-12x^4y^2 + 9x^3y^3 - 12x^3y + 15x^2y^2$

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2. Identify the terms, their coefficients for each of the following expressions

(i) $5xyz^2 - 3zy$ (ii) $1 + x + x^2$

(iii) $4x^2y^2 - 4x^2y^2z^2 + z^2$

(iv) $3 - pq + qr - rp$

(v) $\frac{x}{2} + \frac{y}{2} - xy$

(vi) $0.3a - 0.6ab + 0.5b$



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3. Add the following.

(i) $ab - b, bc - ca, ca - ab$

(ii) $a - b + ab, b - c - a + bc, c - a + ac$

(iii) $2p^2q^2 - 3pq + 4, 5 + 7pq - 3p^2q^2$

(iv) $l^2 + m^2, m^2 + n^2, n^2 + l^2, 2lm + 2mn + 2nl$



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4. Classify the following polynomials as monomials, binomials, trinomials.

Which polynomials do not fit in any of these three categories?

$$x + y, 1000, x + x^2 + x^3 + x^4, 7 + y + 5x, 2y - 3y^2, 2y - 3y^2 + 4y^3, 5x$$



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Exercise 9 5

1. Simplify.

(i) $(a^2 - b^2)^2$

(ii) $(2x + 5)^2 - (2x - 5)^2$

(iii) $(7m - 8n)^2 + (7m + 8n)^2$

(iv) $(4m + 5n)^2 + (5m + 4n)^2$

(v) $(2.5p - 1.5q)^2 - (1.5p - 2.5q)^2$

(vi) $(ab + ba)^2 - 2ab^2c$

(vii) $(m^2 - n^2m)^2 + 2m^3n^2$



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2. Use a suitable identity to get each of the following products. (i)

$(x + 3)(x + 3)$ (ii) $(2y + 5)(2y + 5)$ (iii) $(2a - 7)(2a - 7)$ (iv)

$\left(3a - \frac{1}{2}\right)\left(3a - \frac{1}{2}\right)$ (v) $(1.1m - 0.4)(1.1m + 0.4)$ (vi)

$(a^2 + b^2)(-a^2 + b^2)$ (vii) $(6x - 7)(6x + 7)$ (viii) $(-a + c)(-a + c)$

(ix) $\left(\frac{x}{2} + \frac{3y}{4}\right)\left(\frac{x}{2} + \frac{3y}{4}\right)$ (x) $(7a - 9b)(7a - 9b)$



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3. Find the following squares by using the identities.

(i) $(b - 7)^2$

(ii) $(xy + 3z)^2$

(iii) $(6x^2 - 5y)^2$

(iv) $\left(\frac{2m}{3} + \frac{3n}{2}\right)^2$

(v) $(0.4p - 0.5q)^2$

(vi) $(2xy + 5y)^2$



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4. Use the identity $(x + a)(x + b) = x^2 + (a + b)x + ab$ to find the following products.

(i) $(x + 3)(x + 7)$

(ii) $(4x + 5)(4x + 1)$

(iii) $(4x + 5)(4x + 1)$

(iv) $(4x + 5)(4x - 1)$

(v) $(2x + 5y)(2x + 3y)$

(vi) $(2a^2 + 9)(2a^2 + 5)$

(vii) $(xyz - 4)(xyz - 2)$



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5. a) $3x(4x - 5) + 3 = 12x^2 - 15x + 3$ when $x=3 = 12 \cdot 3^2 - 15 \cdot 3 + 3 = 111 - 45 = 66$

b) $a(a^2 + a + 1) + 5 = a^3 + a^2 + a + 5$ when $a=0 = 5$ when $a=1 = 1+1+1+5 = 8$

when $a=-1 = -1+1-1+5 = 4$.



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6. Using $a^2 - b^2 = (a + b)(a - b)$, find

(i) $51^2 - 49^2$

(ii) $(1.02)^2 - (0.98)^2$

(iii) $153^2 - 147^2$

(iv) $12.1^2 - 7.9^2$



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7. Using identities, evaluate.

(i) 71^2

(ii) 99^2

(iii) 102^2

(iv) 998^2

(v) 5.2^2

(vi) 297×303

(vii) 78×82

(viii) 892

(ix) 105×95



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8. Using $(x + a)(x + b) = x^2 + (a + b)x + ab$, find

(i) 103×104

(ii) 51×52

(iii) 103×98

(iv) 97×98



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Exercise 9 4

1. Find the product.

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

(ii) $(x + 7y)(7x - y)$

(iii) $(a^2 + b)(a + b^2)$

(iv) $(p^2 - q^2)(2p + q)$



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2. Simplify. (i) $(x^2 - 5)(x + 5) + 25$ (ii) $(a^2 + 5)(b^3 + 3) + 5$ (iii)
 $(t + s^2)(t^2 - s)$ (iv) $(a + b)(c - d) + (9a - b)(c + d) + 2(ac + bd)$ (v)
 $(x + y)(2x + y) + (x + 2y) + (x + 2y)(x - y)$ (vi)
 $(x + y)(x^2 - xy + y^2)$ (vii) $(1.5x - 4y)(1.5x + 4y + 3) - 4.5x + 12y$
(viii) $(a + b + c)(a + b - c)$



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3. Multiply the binomials.

- (i) $(2x + 5)$ and $(4x - 3)$
(ii) $(y - 8)$ and $(3y - 4)$
(iii) $(25l - 05m)$ and $(25l + 05m)$
(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 $\left((a^2) - \frac{2}{3}(b^2)\right)$



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Exercise 9 3

1. Find the product.

(i) $(a^2) \times (2a^{22}) \times (4a^{26})$

(ii) $\left(\frac{2}{3}xy\right) \times \left(\frac{-9}{3}xy\right) \times \left(\frac{-9}{10}x^2y^2\right)$

(iii) $\left(-\frac{10}{3}p^3q\right) \times \left(\frac{6}{5}p^3q\right)$

(iv) $x \times x^2 \times x^3 \times x^4$



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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	...



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3. 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) $pq + qr + rp, 0$



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

(b) add: $2x(z - x - y)$ and $2y(z - y - x)$

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

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



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



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