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

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

Answer.
(i) Area of rectangle
$= \text{ length } \times b \text{ readth}$
$= p \times q = pq \text{ sq. units}$
(ii) Area of rectangle
$= \text{ length } \times \text{ readth}$
$= 10 \text{ m} \times 5\text{n} = (10 \times 5)(\text{m} \times \text{n})$
$= 50\text{mn sq. units}$
(iii) Area of rectangle = length $\times$ breadth
$= 20x^2 \times 5y^2 = (20 \times 5)\left(x^2 \times y^2\right)$
$= 100x^2y^2 \text{ sq. units}$
(iv) Area of rectangle = length $\times$ breadth

$= 4x \times 3x^2 = (4 \times 3)\left(x \times x^2\right)$

$= 12x^3$ sq. units

(v) Area of rectangle = length $\times$ reaadth

$= 3mn \times 4np = (3 \times 4)(mn \times np)$

$= 12mn^2p$ sq. units

Ex 8.2 Question 3.

Complete the table of products:

(i)

First monomial $\longrightarrow$ **Second monomial** $\downarrow$	$2x$	$-5y$	$3x^2$	$-4xy$	$7x^2y$	$-9x^2y^2$
$2x$	$4x^2$	.....	.....	.....	.....	.....
$-5y$	.....	.....	$-15x^2y$	.....	.....	.....
$3x^2$	.....	.....	.....	.....	.....	.....
$-4xy$	.....	.....	.....	.....	.....	.....
$7x^2y$	.....	.....	.....	.....	.....	.....
$-9x^2y^2$	.....	.....	.....	.....	.....	.....

Answer.

(i)

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

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

$=$ length $\times$ breadth $\times$ height

$= 5a \times 3a^2 \times 7a^4 = (5 \times 3 \times 7)\left(a \times a^2 \times a^4\right)$

$= 105a^7$ cubic units

(ii) Volume of rectangular box

$=$ length $\times$ breadth $\times$ height

$= 2p \times 4q \times 8r = (2 \times 4 \times 8)(p \times q \times r)$

$= 64pqr$ cubic units

(iii) Volume of rectangular box

$=$ length $\times$ breadth $\times$ height

$= xy \times 2x^2y \times 2xy^2$

$= (1 \times 2 \times 2)\left(x \times x^2 \times x \times y \times y \times y^2\right)$

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

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

Answer.

(i) Volume of rectangular box

$=$ length $\times$ breadth $\times$ height

$= 5a \times 3a^2 \times 7a^4 = (5 \times 3 \times 7)\left(a \times a^2 \times a^4\right)$

$= 105a^7$ cubic units

(ii) Volume of rectangular box

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

$= 2p \times 4q \times 8r = (2 \times 4 \times 8)(p \times q \times r)$

$= 64pqr$ cubic units

(iii) Volume of rectangular box

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

$= xy \times 2x^2y \times 2xy^2$

$= (1 \times 2 \times 2)\left(x \times x^2 \times x \times y \times y \times y^2\right)$

$= 4x^4y^4$ cubic units

(iv) Volume of rectangular box

$= \text{length} \times \text{readth} \times \text{height}$

$= a \times 2b \times 3c = (1 \times 2 \times 3)(a \times b \times c)$

$= 6abc$ cubic units

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) $a \times \left(-a^2\right) \times a^3 = (-1)\left(a \times a^2 \times a^3\right)$

$= -a^6$

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

$= (2 \times 4 \times 8 \times 16)\left(y \times y^2 \times y^3\right)$

$= 1024y^6$

(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) $m \times -mn \times mηp = (-1)(m \times m \times m \times n \times n \times p)$

$= -m^3n^2p$

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

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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) $\left(a^2 - 9\right) \times 4a = a^2 \times 4a - 4a \times 9 = 4a^3 - 36a$
(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) $\left(a^2\right)\times\left(2a^{22}\right)\times\left(4a^{26}\right)$

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

$=(2\times 4)\left(a^2\times a^{22}\times a^{25}\right)$

$=8\times a^{2+22+26}=8a^{50}$

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

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

$=\frac{-3}{5}x^3y^3$

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

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

$=-4p^4q^4$

(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: $a\left(a^2+a+1\right)+5$ 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) $a\left(a^2 + a + 1\right) + 5$

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

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

(i) For $a = 0 : a^3 + a^2 + a + 5$

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

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

(ii) For $a = 1 = a^3 + a^2 + a + 5$

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

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

(ii) For $a = 1 : a^3 + a^2 + a + 5$

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

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

(iii) For $a = -1 \cdot a^3 + a^2 + a + 5$

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

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

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

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

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

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

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

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

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

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

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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) $\left(2pq+3q^2\right)$ and $\left(3pq-2q^2\right)$

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

Answer.

(i) $(2x+5)\times(4x-3)$

$=2x(4x-3)+5(4x-3)$

$=2x\times 4x-2x\times 3+5\times 4x-5\times 3$

$=8x^2-6x+20x-15$

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

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

(ii) $(y-8)\times(3y-4)=y(3y-4)-8(3y-4)$

$=y\times 3y-y\times 4-8\times 3y-8\times -4$

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

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

(iii) $(2.5l-0.5m)\times(2.5l+0.5m)$

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

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

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

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

(iv) $(a+3b)\times(x+5)=a(x+5)+3b(x+5)$

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

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

(v) $\left(2pq+3q^2\right)\left(3pq-2q^2\right)$

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

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

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

$= 6p^2q^2 + 5pq^3 - 6q^4$

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

$= \left(\frac{3}{4}a^2 + 3b^2\right) \times \left(4a^2 - \frac{8}{3}b^2\right)$

$= \frac{3}{4}a^2 \times \left(4a^2 - \frac{8}{3}b^2\right) + 3b^2 \times \left(4a^2 - \frac{8}{3}b^2\right)$

$= \frac{3}{4}a^2 \times 4a^2 - \frac{3}{4}a^2 \times \frac{8}{3}b^2 + 3b^2 \times 4a^2 - 3b^2 \times \frac{8}{3}b^2$

$= 3a^4 - 2a^2b^2 + 12a^2b^2 - 8b^4$

$= 3a^4 + 10a^2b^2 - 8b^4$

Ex 8.4 Question 2.

Find the product:

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

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

(iii) $\left(a^2 + b\right)\left(a + b^2\right)$

(iv) $\left(p^2 - q^2\right)(2p + q)$

Answer.

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

$= 5 \times (3 + x) - 2x(3 + x)$

$= 5 \times 3 + 5 \times x - 2 \times \times 3 - 2x \times x$

$= 15 + 5x - 6x - 2x^2 = 15 - x - 2x^2$

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

$= x(7x - y) + 7y \times (7x - y)$

$= x \times 7x - x \times y + 7y \times 7x - 7y \times y$

$= 7x^2 - xy + 49xy - 7y^2$

$= 7x^2 + 48xy - 7y^2$

(iii) $\left(a^2 + b\right)\left(a + b^2\right)$

$= a^2 \times \left(a + b^2\right) + b \times \left(a + b^2\right)$

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

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

(iv) $\left(p^2 - q^2\right)(2p + q)$

$= p^2 \times (2p + q) - q^2(2p + q)$

$= p^2 \times 2p + p^2 \times q - q^2 \times 2p - q^2 \times q$

$= 2p^3 + p^2q - 2pq^2 - q^3$

Ex 8.4 Question 3.

Simplify:

(i) $\left(x^2 - 5\right)(x + 5) + 25$

(ii) $\left(a^2 + 5\right)\left(b^2 + 3\right) + 5$

(iii) $\left(t + s^2\right)\left(t^2 - s\right)$

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

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

(vi) $(x + y)\left(x^2 - xy + y^2\right)$

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

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

Answer.

(i) $\left(x^2 - 5\right)(x + 5) + 25$

$= x^2(x + 5) - 5(x + 5) + 25$

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

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

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

(ii) $\left(a^2 + 5\right)\left(b^3 + 3\right) + 5$

$= a^2\left(b^3 + 3\right) + 5\left(b^3 + 3\right) + 5$

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

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

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

(iii) $\left(t + s^2\right)\left(t^2 - s\right) = t\left(t^2 - s\right) + s^2\left(t^2 - s\right)$

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

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

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

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

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

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

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

$= 4ac$

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

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

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

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

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

(vi) $(x + y)\left(x^2 - xy + y^2\right)$

$= x\left(x^2 - xy + y^2\right) + y\left(x^2 - xy + y^2\right)$

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

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

$= x^3 + y^3$

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

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

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

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

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

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

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

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

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

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