

EXERCISE 9.1

1. 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) $0.3a - 0.6ab + 0.5b$

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

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

$x + y$, 1000 , $x + x^2 + x^3 + x^4$, $7 + y + 5x$, $2y - 3y^2$, $2y - 3y^2 + 4y^3$, $5x - 4y + 3xy$, $4z - 15z^2$,

$ab + bc + cd + da$, pqr , $p^2q + pq^2$, $2p + 2q$

3. Add the following.

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

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

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

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

4. (a) Subtract: $4a - 7ab + 3b + 12$ from $12a - 9ab + 5b - 3$

(b) Subtract: $3xy + 5yz - 7zx$ from $5xy - 2yz - 2zx + 10xyz$

(c) Subtract: $4p^2q - 3pq + 5pq^2 - 8p + 7q - 10$ from $18 - 3p - 11q + 5pq - 2pq^2 + 5p^2q$

TEST YOURSELF (AEI-1)

1. Identify the terms and their coefficients for the following expressions:

(i) $3abc - 5ca$

(ii) $1 + x + y^2$

(iii) $3x^2y^2 - 3xyz + z^3$

(iv) $-7 + 2pq - \frac{5}{7}qr + rp$

(v) $\frac{x}{2} - \frac{y}{2} - 0.3xy$

2. Classify the following polynomials as monomials, binomials and trinomials:

$3x^2$, $3x + 2$

$x^2 - 4x + 2$,

$x^5 - 7$,

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

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

$xy + yz + zx$,

$a^2b + b^2c$,

$2l + 2m$

3. Add the following algebraic expressions:

(i) $2x^2 + 3x + 5$, $3x^2 - 4x - 7$

(ii) $x^2 - 2x - 3$, $x^2 + 3x + 1$

(iii) $2t^2 + t - 4$, $1 - 3t - 5t^2$

(iv) $xy - yz$, $yz - xz$, $zx - xy$

(v) $a^2 + b^2$, $b^2 + c^2$, $c^2 + a^2$, $2ab + 2bc + 2ca$

4. (i) Subtract $2a - b$ from $3a - b$
 (ii) Subtract $-3x + 8y$ from $-7x - 10y$
 (iii) Subtract $2ab + 5bc - 3ca$ from $7ab - 2bc + 10ca$
 (iv) Subtract $x^5 - 2x^2 - 3x$ from $x^3 + 3x^2 + 1$
 (v) Subtract $3x^2y - 2xy + 2xy^2 + 5x - 7y - 10$ from $15 - 2x + 5y - 11xy + 2xy^2 + 8x^2y$

EXERCISE 9.2

1. Find the product of the following pairs of monomials.
 (i) $4, 7p$ (ii) $-4p, 7p$
 (iii) $-4p, 7pq$ (iv) $4p^3, -3p$
 (v) $4p, 0$
2. Find the areas of rectangles with the following pairs of monomials as their lengths and breadths respectively.
 $(p, q); (10m, 5n); (20x^2, 5y^2); (4x, 3x^2); (3mn, 4np)$
3. Complete the table of products.

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

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) $xy, 2x^2, 2xy^2$ (iv) $a, 2b, 3c$
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) $m, -mn, mnp$

TEST YOURSELF (AEI-2)

- Find the product of the following pairs of monomials:
 - $3, 7x$
 - $-7x, 3y$
 - $-3a, 5ab$
 - $5a^2, -4a$
 - $\frac{3}{7}x^5, \frac{14}{9}x^2$
 - xy^2, x^2y
 - x^3y^5, xy^2
 - abc, abc
 - xyz, x^2yz
 - $a^2b^2c^3, abc^2$
- Find out the product (Volume):
 - $2a, 3a^2, 5a^4$
 - $2x, 4y, 9z$
 - ab, bc, ca
 - $m, 4m, 3m^2, -6m^3$
 - xyz, y^2z, yx^2
 - lm^2, mn^2, ln^2
 - $-2p, -3q, -5p^2$
- Find the product:
 - $(a^3) \times (2a^5) \times (4a^{15})$
 - $\left(\frac{2}{3}ab\right)\left(-\frac{15}{8}a^2b^2\right)$
- Find the areas of rectangles with the following pair of monomials as their lengths and breaths respectively:
 - (a, b)
 - $(5p, 10q)$
 - $(14x, 5x^2)$
 - $(13mn, 4np)$
 - $(20x^2, 100y^2)$
- Find the product:
 - $a^3 \times 2a^5 \times 4a^{15}$
 - $5a^2 \times 8a^{20} \times 12a^{44}$
 - $0.5x^2 \times 0.5x^{12} \times 0.5x^{16}$
 - $\frac{2}{3}ab \times \frac{-15}{8}a^2b^2 \times \frac{3}{2}$
 - $\frac{4}{3}a^2 \times \frac{7}{5}a^{12} \times \frac{2}{9}a^{12}$

EXERCISE 9.3

- Carry out the multiplication of the expressions in each of the following pairs.
 - $4p, q + r$
 - $ab, a - b$
 - $a + b, 7a^2b^2$
 - $a^2 - 9, 4a$
 - $pq + qr + rp, 0$

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 | — |

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

4. (a) Simplify: $3x(4x - 5) + 3$ and find its 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) $a = -1$

5. (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 $4c(-a + b + c)$

TEST YOURSELF (AEI-3)

1. Find the product of the following:

(i) $-4p$ and $7p$

(ii) $4x^3$ and $-3x$

(iii) $5x$ and 0

(iv) $-5x^2$ and $\frac{7}{10}x^3y^2$

(v) $-\frac{2}{3}p^2q$, $\frac{3}{4}pq^2$ and $5pqr$ (vi) $-7ab$, $-3a^3$ and $-\frac{2}{7}ab^2$

(vii) $-\frac{1}{2}x^2$, $-\frac{3}{5}xy$, $\frac{2}{3}yz$ and $\frac{5}{7}xyz$ (viii) $\left(\frac{-10}{3}pq^3\right)$ and $\left(\frac{6}{5}p^3q\right)$

2. Multiply:

(i) $(3x - 5y + 7z)$ by $-3xyz$

(ii) $(2p^2 - 3pq + 5q^2 + 5)$ by $-2pq$

