

EXERCISE 7.1

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1. Identify the monomials, binomials, trinomials and quadrinomials from the following expressions:

(i) a^2

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

(iii) $x^3 + y^3 + z^3$

(iv) $x^3 + y^3 + z^3 + 3xyz$

(v) $7 + 5$

(vi) $a b c + 1$

(vii) $3x - 2 + 5$

(viii) $2x - 3y + 4$

(ix) $x y + y z + z x$

(x) $ax^3 + bx^2 + cx + d$

Solution:

(i) Given a^2

a^2 is a monomial expression because it contains only one term

(ii) Given $a^2 - b^2$

$a^2 - b^2$ is a binomial expression because it contains two terms

(iii) Given $x^3 + y^3 + z^3$

$x^3 + y^3 + z^3$ is a trinomial because it contains three terms

(iv) Given $x^3 + y^3 + z^3 + 3xyz$

$x^3 + y^3 + z^3 + 3xyz$ is a quadrinomial expression because it contains four terms

(v) Given $7 + 5$

$7 + 5$ is a monomial expression because it contains only one term

(vi) Given $a b c + 1$

$a b c + 1$ is a binomial expression because it contains two terms

(vii) Given $3x - 2 + 5$

$3x - 2 + 5$ is a binomial expression because it contains two terms

(viii) Given $2x - 3y + 4$

$2x - 3y + 4$ is a trinomial because it contains three terms

(ix) Given $x y + y z + z x$

$x y + y z + z x$ is a trinomial because it contains three terms

(x) Given $ax^3 + bx^2 + cx + d$

$ax^3 + bx^2 + cx + d$ is a quadrinomial expression because it contains four terms

2. Write all the terms of each of the following algebraic expressions:

(i) $3x$

(ii) $2x - 3$

(iii) $2x^2 - 7$

(iv) $2x^2 + y^2 - 3xy + 4$

Solution:

(i) Given $3x$

$3x$ is the only term of the given algebraic expression.

(ii) Given $2x - 3$

$2x$ and -3 are the terms of the given algebraic expression.

(iii) Given $2x^2 - 7$

$2x^2$ and -7 are the terms of the given algebraic expression.

(iv) Given $2x^2 + y^2 - 3xy + 4$

$2x^2$, y^2 , $-3xy$ and 4 are the terms of the given algebraic expression.

3. Identify the terms and also mention the numerical coefficients of those terms:

(i) $4xy$, $-5x^2y$, $-3yx$, $2xy^2$

(ii) $7a^2bc$, $-3ca^2b$, $(-5/2)abc^2$, $3/2abc^2$, $(-4/3)cba^2$

Solution:

(i) Like terms $4xy$, $-3yx$ and Numerical coefficients 4 , -3

(ii) Like terms $(-7a^2bc$, $-3ca^2b)$ and $(-4/3cba^2)$ and their Numerical coefficients 7 , -3 , $(-4/3)$

Like terms are $(-5/2abc^2)$ and $(3/2 abc^2)$ and numerical coefficients are $(-5/2)$ and $(3/2)$

4. Identify the like terms in the following algebraic expressions:

(i) $a^2 + b^2 - 2a^2 + c^2 + 4a$

(ii) $3x + 4xy - 2yz + 52zy$

(iii) $abc + ab^2c + 2acb^2 + 3c^2ab + b^2ac - 2a^2bc + 3cab^2$

Solution:

(i) Given $a^2 + b^2 - 2a^2 + c^2 + 4a$

The like terms in the given algebraic expressions are a^2 and $-2a^2$.

(ii) Given $3x + 4xy - 2yz + 52zy$

The like terms in the given algebraic expressions are $-2yz$ and $52zy$.

(iii) Given $abc + ab^2c + 2acb^2 + 3c^2ab + b^2ac - 2a^2bc + 3cab^2$

The like terms in the given algebraic expressions are ab^2c , $2acb^2$, b^2ac and $3cab^2$.

5. Write the coefficient of x in the following:

(i) $-12x$

(ii) $-7xy$

(iii) xyz

(iv) $-7ax$

Solution:

(i) Given $-12x$

The numerical coefficient of x is -12 .

(ii) Given $-7xy$

The numerical coefficient of x is $-7y$.

(iii) Given xyz

The numerical coefficient of x is yz .

(iv) Given $-7ax$

The numerical coefficient of x is $-7a$.

6. Write the coefficient of x^2 in the following:

- (i) $-3x^2$
- (ii) $5x^2yz$
- (iii) $5/7x^2z$
- (iv) $(-3/2)ax^2 + yx$

Solution:

(i) Given $-3x^2$
The numerical coefficient of x^2 is -3 .

(ii) Given $5x^2yz$
The numerical coefficient of x^2 is $5yz$.

(iii) Given $5/7x^2z$
The numerical coefficient of x^2 is $5/7z$.

(iv) Given $(-3/2)ax^2 + yx$
The numerical coefficient of x^2 is $-(3/2)a$.

7. Write the coefficient of:

- (i) y in $-3y$
- (ii) a in $2ab$
- (iii) z in $-7xyz$
- (iv) p in $-3pqr$
- (v) y^2 in $9xy^2z$
- (vi) x^3 in $x^3 + 1$
- (vii) x^2 in $-x^2$

Solution:

(i) Given $-3y$
The coefficient of y is -3 .

(ii) Given $2ab$
The coefficient of a is $2b$.

(iii) Given $-7xyz$
The coefficient of z is $-7xy$.

(iv) Given $-3pqr$

The coefficient of p is $-3qr$.

(v) Given $9xy^2z$

The coefficient of y^2 is $9xz$.

(vi) Given $x^3 + 1$

The coefficient of x^3 is 1 .

(vii) Given $-x^2$

The coefficient of x^2 is -1 .

8. Write the numerical coefficient of each in the following:

(i) xy

(ii) $-6yz$

(iii) $7abc$

(iv) $-2x^3y^2z$

Solution:

(i) Given xy

The numerical coefficient in the term xy is 1 .

(ii) Given $-6yz$

The numerical coefficient in the term $-6yz$ is -6 .

(iii) Given $7abc$

The numerical coefficient in the term $7abc$ is 7 .

(iv) Given $-2x^3y^2z$

The numerical coefficient in the term $-2x^3y^2z$ is -2 .

9. Write the numerical coefficient of each term in the following algebraic expressions:

(i) $4x^2y - (3/2)xy + 5/2 xy^2$

(ii) $(-5/3)x^2y + (7/4)xyz + 3$

Solution:

(i) Given $4x^2y - (3/2)xy + 5/2 xy^2$

Numerical coefficient of following algebraic expressions are given below

Term	Coefficient
$4x^2y$	4
$-(3/2)xy$	$-(3/2)$
$5/2xy^2$	$(5/2)$

(ii) Given $(-5/3)x^2y + (7/4)xyz + 3$

Numerical coefficient of following algebraic expressions are given below

Term	Coefficient
$(-5/3)x^2y$	$(-5/3)$
$(7/4)xyz$	$(7/4)$
3	3

10. Write the constant term of each of the following algebraic expressions:

(i) $x^2y - xy^2 + 7xy - 3$

(ii) $a^3 - 3a^2 + 7a + 5$

Solution:

(i) Given $x^2y - xy^2 + 7xy - 3$

The constant term in the given algebraic expressions is -3.

(ii) Given $a^3 - 3a^2 + 7a + 5$

The constant term in the given algebraic expressions is 5.

11. Evaluate each of the following expressions for $x = -2$, $y = -1$, $z = 3$:

(i) $(x/y) + (y/z) + (z/x)$

(ii) $x^2 + y^2 + z^2 - xy - yz - zx$

Solution:

(i) Given $x = -2$, $y = -1$, $z = 3$

Consider $(x/y) + (y/z) + (z/x)$

On substituting the given values we get,

$$= (-2/-1) + (-1/3) + (3/-2)$$

The LCM of 3 and 2 is 6

$$= (12 - 2 - 9)/6$$

$$= (1/6)$$

(ii) Given $x = -2$, $y = -1$, $z = 3$

Consider $x^2 + y^2 + z^2 - xy - yz - zx$

On substituting the given values we get,

$$\begin{aligned} &= (-2)^2 + (-1)^2 + 3^2 - (-2)(-1) - (-1)(3) - (3)(-2) \\ &= 4 + 1 + 9 - 2 + 3 + 6 \\ &= 23 - 2 \\ &= 21 \end{aligned}$$

12. Evaluate each of the following algebraic expressions for $x = 1$, $y = -1$, $z = 2$, $a = -2$, $b = 1$, $c = -2$:

(i) $ax + by + cz$

(ii) $ax^2 + by^2 - cz$

(iii) $axy + byz + cxy$

Solution:

(i) Given $x = 1$, $y = -1$, $z = 2$, $a = -2$, $b = 1$, $c = -2$

Consider $ax + by + cz$

On substituting the given values

$$\begin{aligned} &= (-2)(1) + (1)(-1) + (-2)(2) \\ &= -2 - 1 - 4 \\ &= -7 \end{aligned}$$

(ii) Given $x = 1$, $y = -1$, $z = 2$, $a = -2$, $b = 1$, $c = -2$ Consider $ax^2 + by^2 - cz$

On substituting the given values

$$\begin{aligned} &= (-2) \times 1^2 + 1 \times (-1)^2 - (-2) \times 2 \\ &= -2 + 1 - (-4) \\ &= -1 + 4 \\ &= 3 \end{aligned}$$

(iii) Given $x = 1$, $y = -1$, $z = 2$, $a = -2$, $b = 1$, $c = -2$ Consider $axy + byz + cxy$

$$\begin{aligned} &= (-2) \times 1 \times -1 + 1 \times -1 \times 2 + (-2) \times 1 \times (-1) \\ &= 2 + (-2) + 2 \\ &= 4 - 2 \\ &= 2 \end{aligned}$$