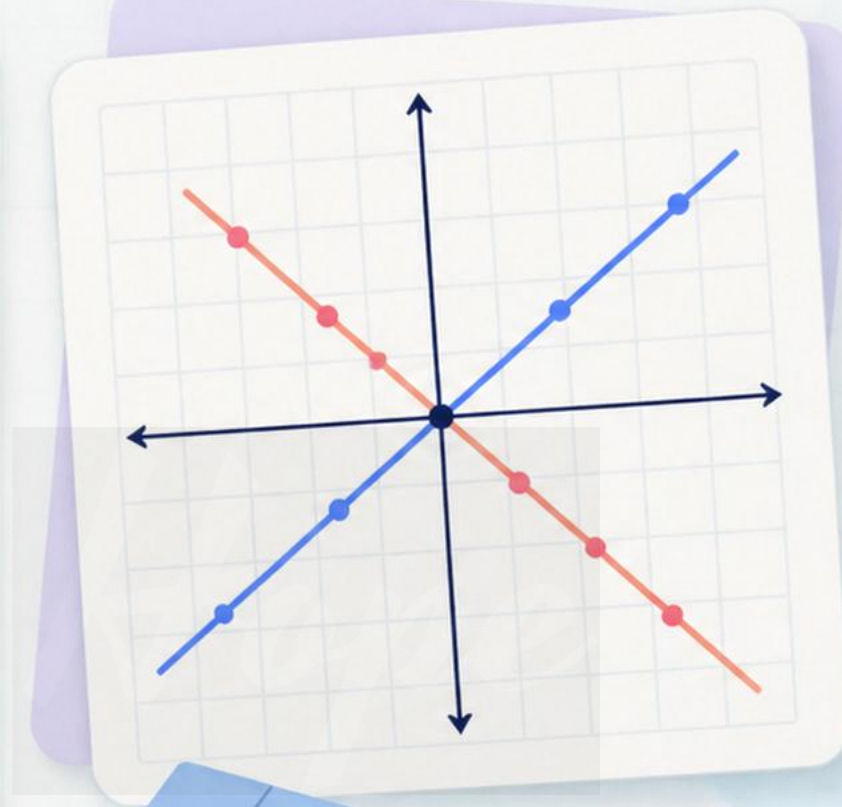


MATHEMATICS • CLASS 9

CHAPTER 2

Introduction to Linear Polynomials

NCERT SOLUTIONS



THINK AND REFLECT – ALGEBRAIC EXPRESSIONS

EXAMPLE 2: $200l + 160w + 50lw$

- Terms: $200l$, $160w$, $50lw$
- Variables: l and w
- Coefficients: 200, 160, 50
- There is no constant term.

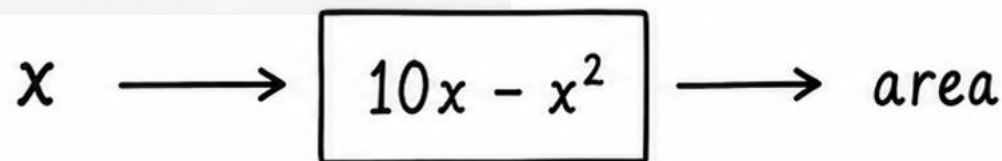


HOW IS IT DIFFERENT FROM $4x + 5y + 3$?

- Both expressions use two variables.
- $4x + 5y + 3$ has a constant term 3.
- $50lw$ contains the product of two variables, so its total degree is 2.

EXAMPLE 3: $10x - x^2$

- Terms: $10x$ and $-x^2$
- Variable: x
- Coefficients: 10 and -1
- Degree: 2, so it is a quadratic polynomial.
- It uses one variable; Example 1 uses two variables.



TERM = each added or subtracted part; **COEFFICIENT** = number multiplying a variable.

EXERCISE SET 2.1 — POLYNOMIAL BASICS

Q1. FIND THE DEGREE:

(i) $2x^2 - 5x + 3 \rightarrow$ highest power = 2 $\rightarrow$ degree **2**

(ii) $y^3 + 2y - 1 \rightarrow$ highest power = 3 $\rightarrow$ degree **3**

(iii) $-9 = -9x^0 \rightarrow$ degree **0**

(iv) $4z - 3 \rightarrow$ highest power = 1 $\rightarrow$ degree **1**

RULE: Degree = highest power of the variable with non-zero coefficient.

Q2. WRITE EXAMPLES:

Degree 1: $3x + 2$

Degree 2: $x^2 - 4x + 1$

Degree 3: $2x^3 + x - 5$

(Many other correct examples are possible.)

Q3. For $x^4 - 3x^3 + 6x^2 - 2x + 7$:

coefficient of x^2 = **6**

coefficient of x^3 = **-3**

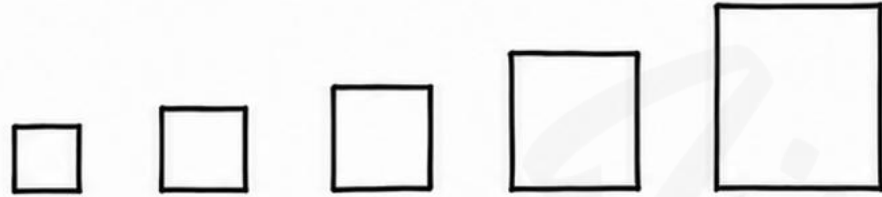
Q4. In $4z^3 + 5z^2 - 11$, there is no z -term, so coefficient of z = **0**.

Q5. In $9x^3 + 5x^2 - 8x - 10$, constant term = **-10**.

THINK AND REFLECT — LINEAR POLYNOMIALS

SQUARE PERIMETER:

Sides (cm): 1, 1.5, 2, 2.5, 3



$$P = 4s$$

Perimeters (cm): 4, 6, 8, 10, 12

When side increases by 0.5 cm,
perimeter increases by $4 \times 0.5 = 2$ cm.

CHESS CLUB FEE:

Total fee ₹750 consists of a fixed ₹200
plus ₹50 for each match played (m).

$$₹750 = 200 + 50m$$

$$50m = 550$$

$$m = 11$$

The player played 11 matches.

INPUT → OUTPUT:

$$\text{Area } A(x) = 10x - x^2$$

For input $x = 6$ cm:

$$A(6) = 10(6) - 6^2$$

$$= 60 - 36 = 24 \text{ cm}^2$$

$$x = 6 \rightarrow 10x - x^2 \rightarrow 24 \text{ cm}^2$$

input = rectangle length x ;
output = rectangle area.

A linear pattern changes by a constant amount at equal steps.

EXERCISE SET 2.2 — Q1 & Q2

Q1. Find $5x - 3$.

(i) $x = 0$:

$$5(0) - 3 = -3$$

(ii) $x = -1$:

$$5(-1) - 3 = -5 - 3 = -8$$

(iii) $x = 2$:

$$5(2) - 3 = 10 - 3 = 7$$

Answers: $-3, -8, 7$.

Q2. Find $7s^2 - 4s + 6$.

(i) $s = 0$:

$$7(0)^2 - 4(0) + 6 = 6$$

(ii) $s = -3$:

$$\begin{aligned} 7(-3)^2 - 4(-3) + 6 \\ = 7(9) + 12 + 6 \\ = 63 + 12 + 6 = 81 \end{aligned}$$

(iii) $s = 4$:

$$\begin{aligned} 7(4)^2 - 4(4) + 6 \\ = 7(16) - 16 + 6 \\ = 112 - 16 + 6 = 102 \end{aligned}$$

Answers: $6, 81, 102$.

Substitute the value first; then follow the order of operations.

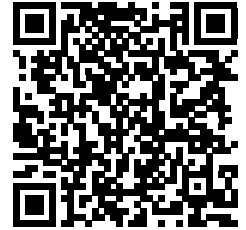


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