

Comprehensive Notes
of
Central Board of Secondary Education

Class IX

Mathematics
(Ganita Manjari)

Chapter -2 (Introduction to Linear Polynomials)

by

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Algebraic Expressions

Definition:

An algebraic expression is a mathematical phrase made up of:

- numbers (constants),
- variables,
- and operation symbols such as +, −, ×, and ÷.

Example

$$2x^2 + 5xy - 3y^2$$

Here:

- x and y are variables
- $2x^2$, $5xy$, and $-3y^2$ are terms
- 2, 5, and -3 are coefficients

Parts of an Algebraic Expression:

Part	Meaning	Example
Variable	Symbol representing an unknown value	x, y
Constant	Fixed numerical value	7, -3
Coefficient	Number multiplying a variable	5 in $5x$
Term	Product of numbers and variables	$3x^2$

Types of Algebraic Expressions:

Type	Number of Terms	Example
Monomial	One term	$5x$
Binomial	Two terms	$x + 2$
Trinomial	Three terms	$x^2 + 3x + 2$

Solved Examples:

Example 1: Identify variables, terms, and coefficients in: $4x^2 - 7x + 9$

Solution

- Variables: x
 - Terms: $4x^2, -7x, 9$
 - Coefficients: $4, -7$
 - Constant: 9
-

Example 2: State the number of terms in: $5a - 3b + 2c - 8$

Solution

Terms are:

- $5a$
- $-3b$
- $2c$
- -8

Therefore, number of terms = 4

Univariate Polynomials

Definition:

A univariate polynomial is a polynomial that contains only one variable.

- “Uni” means one
- “Variable” means a symbol like x , y , or t

Thus, a univariate polynomial has only one variable throughout the expression.

Examples:

$$x^2 + 5x + 3$$

$$3y^3 - 4y^2 + 5$$

The first polynomial has variable x , and the second has variable y .

Examples of Univariate Polynomials:

$$x^2 + 5x + 3$$

Variable used: only x

$$3y^3 - 4y + 7$$

Variable used: only y

$$5a^4 + 2a^2 - a + 9$$

Variable used: only a

Non-Examples:

These are not univariate polynomials because they contain more than one variable:

$x + y$ (two variables: x and y)

$2xy + x^2$ (two variables)

Standard Form of a Univariate Polynomial:

A polynomial is generally written in descending order of powers.

Example

$$4x^3 + 2x^2 - 5x + 7$$

This is already in standard form because powers are:

3, 2, 1, 0

Linear Polynomial

Definition:

A polynomial of degree 1 is called a linear polynomial.

This means:

- the highest power of the variable is 1,
- and no variable has power greater than 1.

Understanding the Parts:

In: $ax + b$

Part	Meaning:
a	Coefficient of variable
x	Variable
b	Constant term

Examples of Linear Polynomials

$$2x + 3$$

$$5y - 7$$

$$9a + 1$$

$$x - 10$$

Why Are They Called Linear?

They are called linear because:

- their graph forms a straight line.

Example:

$$y = 2x + 1$$

Its graph is a straight line.

Degree of Linear Polynomial:

The degree is always: 1

because the highest power of the variable is 1.

Examples with Degree:

Polynomial	Highest Power	Degree
$2x + 3$	1	1
$7y - 9$	1	1
$x + 5$	1	1

Non-Examples of Linear Polynomials:

These are not linear polynomials:

Polynomial Reason

$$x^2 + 3 \quad \text{Degree is 2}$$

$$x^3 + 1 \quad \text{Degree is 3}$$

$$\frac{1}{x} + 2 \quad \text{Variable in denominator}$$

Standard Form:

Linear polynomials are usually written in standard form:

$$ax + b$$

Example:

$$3x + 5$$

Terms in a Linear Polynomial:

Example: $7x + 9$

Terms are: $7x, 9$

Coefficients:

Example: $5x - 3$

- coefficient of x is: 5
- constant term: -3

Solved Examples:

Example 1 — Identify Linear Polynomial

Which of the following are linear polynomials?

1. $2x + 5$

Solutions:

1. $2x + 5$

Highest power: 1

Linear polynomial ✓

Example 2 — Identify Coefficient and Constant for $8x - 11$

Solution

Coefficient of x : 8

Constant term: -11

Example 4 — Write a Linear Polynomial

Write a linear polynomial with:

- coefficient = 4
- constant = 7

Solution: $4x + 7$

Graph of Linear Polynomial:

Example: $y = 2x + 1$

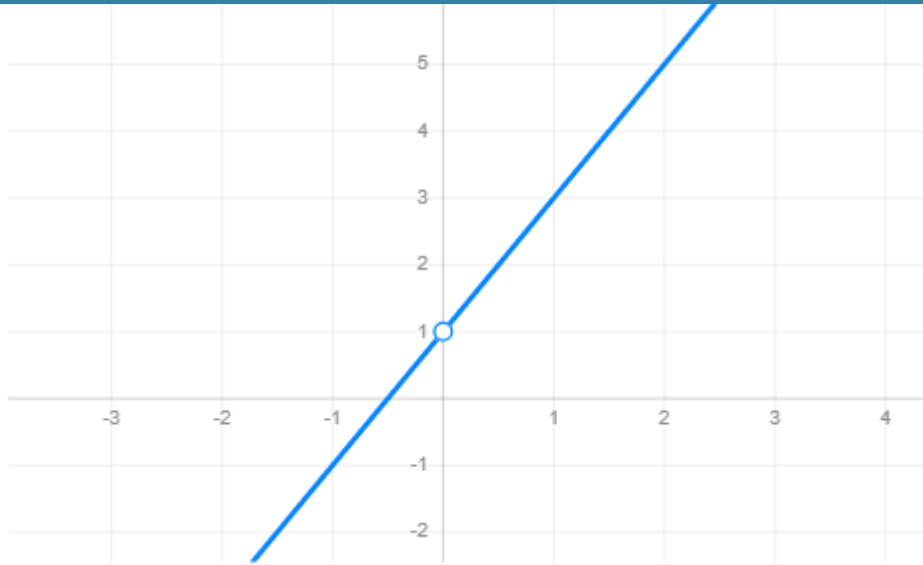
This forms a straight line.

Table of Values

x	$y = 2x + 1$
0	1
1	3
2	5
3	7

Notice:

- increase in x causes equal increase in y ,
- showing a constant rate of change.



Real-Life Examples of Linear Polynomials:

Example 1. Taxi Fare

Taxi charges:

- ₹50 fixed charge,
- ₹10 per kilometer.

If distance is x km:

$$F(x) = 10x + 50$$

This is a linear polynomial.

Example 2. Salary Growth

Monthly salary:

- fixed salary ₹20,000,
- ₹500 bonus per extra task.

If number of tasks is x :

$$S(x) = 500x + 20000$$

Linear polynomial.

Example 3. Mobile Recharge

A recharge company charges:

- ₹100 fixed fee,
- ₹2 per minute.

$$C(x) = 2x + 100$$

Linear Pattern

Linear polynomials create linear patterns.

Example: $2x + 1$

Substitute values:

x	Result
1	3
2	5
3	7
4	9

Difference between terms: 2

Constant difference means linear pattern.

Common Mistakes:

Incorrect Idea	Correct Idea
Any polynomial is linear	Only degree 1 polynomials are linear
$x^2 + 1$ is linear	It is quadratic
Degree means number of terms	Degree means highest power

Solved Examples:

Example 1

Is $7x^2 + 2a$ a linear polynomial?

Solution

Degree = 2

Therefore, it is not a linear polynomial.

Example 2

Write a linear polynomial with coefficient 4 and constant 9.

Solution

$$4x + 9$$

Degree of a Polynomial

Definition:

The degree of a polynomial is the highest power of the variable present in the polynomial.

Example:

$$5x^3 + 2x^2 - 7x + 1$$

Highest power of x is 3.

Therefore:

$$\text{Degree} = 3$$

Classification of Polynomials:

Degree	Name of Polynomial
0	Constant Polynomial
1	Linear Polynomial
2	Quadratic Polynomial
3	Cubic Polynomial

1. Constant Polynomial

A polynomial whose degree is 0 is called a constant polynomial.

It contains only numbers and no variables.

Examples: 5, -9, 100

Why is Degree 0?

A constant can also be written as:

$$5 = 5x^0$$

Since:

$$x^0 = 1$$

the power of variable is: 0

Therefore, degree = 0

Real-Life Example:

A parking fee fixed at ₹50 regardless of time.

$$P(x) = 50$$

The amount never changes.

Hence, it is a constant polynomial.

Solved Examples:**Example 1**

Find the degree of: 7

Solution $7 = 7x^0$

Degree:

Example 2

Is $-15a$ a constant polynomial?

Solution

Yes.

It has no variable.

Therefore, it is a constant polynomial.

Degree of Linear Polynomial

The degree of Linear Polynomial always remains 1.

General Form:

$$ax + b$$

where:

- $a \neq 0$
- a, b are constants

Examples

$$2x + 3$$

$$5y - 7$$

$$9a + 1$$

Why is Degree 1?

Example: $4x + 9$

Highest power of x :

1

Therefore:

$$\text{Degree} = 1$$

Features of Linear Polynomial:

Feature	Description
Highest power	1
Graph	Straight line
Change	Constant rate

Real-Life Examples:

A taxi charges:

- ₹50 fixed charge
- ₹10 per kilometer

If x km is travelled:

$$F(x) = 10x + 50$$

This is a linear polynomial.

Solved Examples**Example 1**

Find degree:

$$7x - 2$$

Solution

Highest power:

1

Hence:

1

Example 2

Classify:

$$5y + 9$$

Solution:

Highest power of y :

1

Therefore:

Linear Polynomial

Example 3

Is $x^2 + 3$ linear?

Solution

Highest power: 2

Therefore:

No, it is not linear.

2. Quadratic Polynomial

Definition:

A polynomial whose degree is 2 is called a quadratic polynomial.

General Form:

$$ax^2 + bx + c$$

where:

- $a \neq 0$
-

Examples

$$x^2 + 5x + 6$$

$$3y^2 - 2y + 1$$

$$7a^2 + 4$$

Why is Degree 2?

Example:

$$5x^2 + 3x - 1$$

Highest power:

Therefore:

$$\text{Degree} = 2$$

Real-Life Example:

Area of a square:

$$A = x^2$$

If side doubles, area increases rapidly.

This is quadratic growth.

Solved Examples

Example 1

Find degree:

$$9x^2 - 4x + 7$$

Solution

Highest power: 2

Hence:

2

Example 2

Classify:

$$4y^2 + 9$$

Solution

Highest power: 2

Therefore:

Quadratic Polynomial

Example 3

Is $x^3 + 2x$ quadratic?

Solution

Highest power: 3

Therefore:

No.

It is cubic.

3. Cubic Polynomial:

Definition:

A polynomial whose degree is 3 is called a cubic polynomial.

General Form:

$$ax^3 + bx^2 + cx + d$$

where:

- $a \neq 0$

Examples

$$\begin{aligned}x^3 + 2x^2 - 5x + 1 \\4y^3 - 7y + 2 \\5a^3 + 1\end{aligned}$$

Why is Degree 3?

Example:

$$8x^3 + 2x - 1$$

Highest power: 3

Therefore:

Degree = 3

Real-Life Example:

Volume of a cube:

$$V = x^3$$

If side length increases, volume grows cubically.

Solved Examples

Example 1

Find degree:

$$5x^3 - 2x + 4$$

Solution

Highest power:

3

Therefore:

3

Example 2

Classify:

$$7y^3 + 1$$

Solution

Highest power: 3

Hence:

Cubic Polynomial

Example 3

Is $x^2 + 5x + 1$ cubic?

Solution

Highest power: 2

Therefore: No.

It is quadratic.

Comparison Table:

Type	Degree	General Form	Example
Constant	0	c	5
Linear	1	$ax + b$	$2x + 3$
Quadratic	2	$ax^2 + bx + c$	$x^2 + 5x + 1$
Cubic	3	$ax^3 + bx^2 + cx + d$	$x^3 + 2x + 1$

Visual Understanding of Graphs:

Polynomial Type	Shape
Constant	Horizontal line
Linear	Straight line
Quadratic	U-shaped curve
Cubic	S-shaped curve

Mixed Solved Examples

Example 1

Classify: 9

Solution : Degree: 0

Hence: Constant Polynomial

Example 2

Classify: $4x - 7$

Solution : Highest power: 1

Hence: Linear Polynomial

Example 3 : Classify: $2x^2 + 5x + 9$

Solution

Highest power: 2

Hence: Quadratic Polynomial

Example 4

Classify: $x^3 + 7x - 1$

Solution: Highest power: 3

Hence: Cubic Polynomial

Linear Equations

Definition:

An equation whose highest power of variable is 1 is called a linear equation.

General Form:

$$ax + b = 0$$

Examples

$$2x + 5 = 9$$
$$3y - 7 = 11$$

Solved Examples:

Example 1

Solve:

$$2x + 5 = 13$$

Solution

$$2x = 13 - 5$$
$$2x = 8$$
$$x = 4$$

Example 2

Solve:

$$3y - 7 = 11$$

Solution

$$3y = 18$$

$$y = 6$$

Linear Pattern

Definition:

A linear pattern is a sequence where the difference between consecutive terms is constant.

Example

2, 5, 8, 11, 14

Difference:

$$5 - 2 = 3$$

$$8 - 5 = 3$$

Constant difference = 3

Hence, it is a linear pattern.

Real-Life Example:

A taxi fare increases by ₹10 for every kilometer travelled.

Distance (km)	Fare (₹)
1	50
2	60
3	70
4	80

The increase is constant, so this forms a linear pattern.

Linear Relationship

Definition:

A relationship between two variables represented by a straight line is called a linear relationship.

General Form:

$$y = ax + b$$

where:

- a = slope
- b = y-intercept

Important Terms:

Term	Meaning
Slope	Rate of change
y-intercept	Point where line cuts y-axis

Solved Example:

Example

Find slope and intercept:

$$y = 3x + 2$$

Solution

Comparing with:

$$y = ax + b$$

we get:

- Slope = 3
- y-intercept = 2

Linear Growth

Definition:

When a quantity increases by a fixed amount over equal intervals.

Simple Meaning:

If something grows regularly at a constant rate, it shows linear growth.

Introduction:

In daily life, many quantities:

- increase steadily,
- or decrease steadily over time.

When a quantity changes by a fixed amount at equal intervals, the change is called linear growth or linear decay.

These concepts are important in:

- mathematics,
- economics,
- science,
- business,
- population studies,
- and statistics.

Examples of Linear Growth:

Situation	Growth
Salary increases ₹1000 every year	Constant increase
Plant grows 2 cm every week	Constant increase
Water tank fills 5 liters every minute	Constant increase

Mathematical Form:

Linear growth is represented by:

$$y = ax + b$$

where:

- $a > 0$ (positive slope),
 - b is initial value.
-

Example 1 — Plant Growth

A plant is initially 10 cm tall and grows 3 cm every week.

Step 1: Write Formula

$$H = 3x + 10$$

where:

- H = height,
- x = number of weeks.

Step 2: Find Heights

Weeks Height

0	10
1	13
2	16
3	19

Notice:

- height increases by 3 cm each week.

This is linear growth.

Example 2 — Savings Growth

Ravi saves ₹500 every month. Initially, he has ₹2000.

Formula:

$$S = 500x + 2000$$

where:

- x = months,
- S = savings.

Table

Months Savings

0	2000
1	2500
2	3000
3	3500

Savings increase by fixed amount.

Hence, linear growth.

Graph of Linear Growth

Linear growth forms a straight line rising upward.

Characteristics:

- positive slope,
 - straight line,
 - constant increase.
-

Features of Linear Growth:

Feature	Description
Rate of change	Constant positive
Graph	Upward straight line
Formula	$y = ax + b$
Slope	Positive

Linear Decay

Definition:

Linear decay occurs when a quantity decreases by the same fixed amount over equal intervals.

Simple Meaning:

If something decreases regularly at a constant rate, it shows linear decay.

Examples of Linear Decay:

Situation	Decay
Battery loses 5% charge every hour	Constant decrease
Water tank empties 10 liters per minute	Constant decrease
Temperature drops 2°C every hour	Constant decrease

Mathematical Form:

Linear decay is also represented by:

$$y = ax + b$$

but here:

$$a < 0$$

because the quantity decreases.

Example 1 — Water Tank

A tank initially contains 100 liters of water and loses 5 liters every minute.

Step 1: Formula

$$W = -5x + 100$$

where:

- x = time in minutes,
- W = water left.

Step 2: Table

Minutes	Water Left
0	100
1	95
2	90
3	85

Water decreases by fixed amount.

Hence, linear decay.

Example 2 — Mobile Battery

A mobile battery is 100% charged and loses 10% every hour.

Formula:

$$B = -10x + 100$$

Table

Hours	Battery %
0	100
1	90
2	80
3	70

Battery decreases steadily.

Hence, linear decay.

Graph of Linear Decay

Linear decay forms a straight line sloping downward.

Characteristics:

- negative slope,
- constant decrease,
- straight line.

Features of Linear Decay:

Feature	Description
Rate of change	Constant negative
Graph	Downward straight line
Formula	$y = ax + b$
Slope	Negative

Difference Between Linear Growth and Linear Decay

Linear Growth	Linear Decay
Quantity increases	Quantity decreases
Positive slope	Negative slope
Upward graph	Downward graph
$a > 0$	$a < 0$

Understanding Through Number Patterns

Linear Growth Pattern:

Sequence:

2, 5, 8, 11, 14

Difference:

+3

Constant increase means linear growth.

Linear Decay Pattern:

Sequence:

20, 17, 14, 11, 8

Difference:

-3

Constant decrease means linear decay.

Real-Life Applications:

Linear Growth Applications

Example 1. Salary Increase

Salary increases ₹2000 every year.

Example 2. Population Growth

A town gains 100 people every year.

Example 3. Distance Travelled

A car moves at constant speed.

Linear Decay Applications:

Example 1. Fuel Consumption

Fuel decreases steadily while driving.

Example 2. Melting Ice

Ice melts at constant rate.

Example 3. Water Leakage

Water leaks steadily from tank.

Solved Examples

Example 1 — Identify Growth or Decay

A machine produces 50 extra bottles every hour.

Solution: Increase: +50

Therefore:

Linear Growth

Example 2 — Identify Growth or Decay

A freezer temperature decreases by 2°C every hour.

Solution

Decrease: -2

Therefore:

Linear Decay

Example 3 — Write Formula

A student has ₹500 initially and saves ₹100 every week.

Solution

Formula: $S = 100x + 500$

This represents linear growth.

Example 4 — Write Formula

A candle is 30 cm long and burns 2 cm every hour.

Solution

Formula: $L = -2x + 30$

This represents linear decay.

Common Mistakes:

Incorrect Idea	Correct Idea
Any increase is linear growth	Increase must be constant
Any decrease is linear decay	Decrease must be constant
Curved graph is linear	Linear graphs are straight

Summary Table:

Topic	Key Idea
Algebraic Expression	Combination of variables and numbers
Polynomial	Expression with powers of variables
Degree	Highest power
Linear Polynomial	Polynomial of degree 1
Linear Equation	Equation with highest power 1
Linear Pattern	Constant difference
Linear Relationship	Straight-line relation
Linear Growth	Constant increase
Linear Decay	Constant decrease

Practice Worksheet

Multiple Choice Questions (MCQs)

Algebraic Expressions:

1. Which of the following is an algebraic expression?

(a) $5 + 3 = 8$

(b) $2x + 7$

(c) $7 > 5$

(d) $4:2$

2. In $5x + 3$, the coefficient of x is:

(a) 3

(b) 5

(c) x

(d) 8

3. Which of the following is a variable?

(a) 7

(b) +

(c) y

(d) 9

4. Number of terms in: $x^2 + 3x + 5$ is:

(a) 1

(b) 2

(c) 3

(d) 4

5. Degree of: $7x^4 + 2x + 1$ is:

(a) 1

(b) 2

(c) 3

(d) 4

6. Degree of constant polynomial is:

(a) 0

(b) 1

(c) 2

(d) 3

7. Which is a quadratic polynomial?

(a) $x + 2$

(b) $x^2 + 5x + 1$

(c) $x^3 + 1$

(d) 9

8. Which is a linear equation?

(a) $x^2 + 1 = 0$

(b) $2x + 5 = 9$

(c) $x^3 = 8$

(d) $1/x = 2$

9. Solution of: $x + 7 = 15$ is:

- (a) 6
- (b) 7
- (c) 8
- (d) 9

10. A univariate polynomial contains:

- (a) One variable
- (b) Two variables
- (c) Three variables
- (d) No variable

11. Which is a univariate polynomial?

- (a) $x + y$
- (b) $x^2 + 3x + 1$
- (c) $xy + 5$
- (d) $x + y + z$

12. Which represents linear growth?

- (a) Fuel decreasing
- (b) Salary increasing yearly
- (c) Battery losing charge
- (d) Temperature falling

13. Which represents linear decay?

- (a) Tree growing
- (b) Savings increasing
- (c) Water tank emptying steadily
- (d) Population increasing

14. Which sequence shows linear pattern?

- (a) 2, 4, 8, 16
- (b) 5, 10, 15, 20
- (c) 1, 1, 2, 3
- (d) 3, 9, 27

15. Graph of linear relationship is:

- (a) Circle
- (b) Triangle
- (c) Straight line
- (d) Curve

16. Which polynomial is linear?

- (a) $x^2 + 1$
- (b) $2x + 5$
- (c) $x^3 + 2$
- (d) 7

17. Degree of: $9x^3 + 2x^2 + 1$ is:

- (a) 1
- (b) 2
- (c) 3
- (d) 4

18. Which is a cubic polynomial?

- (a) $x + 5$
- (b) $x^2 + 3$
- (c) $x^3 + 2x + 1$
- (d) 9

19. Linear decay has:

- (a) Positive slope
- (b) Negative slope
- (c) No slope
- (d) Infinite slope

20. Linear growth means increase by:

- (a) Random amount
- (b) Fixed amount
- (c) Zero amount
- (d) Unequal amount

Fill In the Blanks:

1. An expression containing variables and constants is called an _____ expression.
2. In $7x + 5$, the coefficient of x is _____.

3. Degree of: $x^2 + 3x + 1$ is _____.
4. A polynomial with degree 1 is called a _____ polynomial.
5. A polynomial with degree 2 is called a _____ polynomial.
6. A polynomial with degree 3 is called a _____ polynomial.
7. A polynomial containing only one variable is called a _____ polynomial.
8. In a linear equation, highest power of variable is _____.
9. Graph of linear relationship is a straight _____.
10. Linear growth means quantity increases by a _____ amount.
11. Linear decay means quantity decreases by a _____ amount.
12. Degree of constant polynomial is _____.
13. Sequence: 2, 5, 8, 11 shows linear _____.
14. In: $5x + 3$, constant term is _____.
15. Variable in: $7y^2 + 3y + 1$ is _____.
16. Solution of: $x + 4 = 10$ is _____.
17. Highest power in: $4x^5 + 2$ is _____.
18. Linear growth has _____ slope.
19. Linear decay has _____ slope.
20. A polynomial of degree 0 is called _____ polynomial.

True / False:

1. $x^2 + 3x + 1$ is a linear polynomial.
2. Degree of: $7x^5 + 1$ is 5.
3. A univariate polynomial has only one variable.
4. Linear growth always decreases.
5. Linear decay has negative slope.
6. $2x + 5 = 9$ is a linear equation.

7. Constant polynomial has degree 0.
 8. Linear patterns have constant difference.
 9. Graph of linear relationship is curved.
 10. $x + y$ is a univariate polynomial.
-

Statement Sums:

Algebraic Expressions (10)

1. Write algebraic expression: “5 more than a number x ”.
2. Write algebraic expression: “Twice a number decreased by 7”.
3. Write expression: “Product of 4 and a number y ”.
4. Write expression: “10 less than a number a ”.
5. Write expression: “Sum of x and 9”.
6. Identify coefficient and constant in: $7x + 4$
7. Number of terms in: $x^2 + 5x + 1$
8. Write algebraic expression: “Three times a number plus 8”.
9. Identify variables in: $5a^2 + 3a + 1$
10. Write expression: “Half of a number p ”.

Degree of Polynomials:

11. Find degree:

$$5x^3 + 2x + 1$$

12. Find degree:

$$7x^4 + 9$$

13. Find degree:

$$8y^2 - 5y + 1$$

14. Find degree:

15. Classify:

$$x + 5$$

16. Classify:

$$x^2 + 3x + 1$$

17. Classify:

$$x^3 + 2x$$

18. Find highest power:

$$4x^6 + 1$$

19. Is: $x^2 + 1$ linear?

20. Find degree:

$$10x^5 + 2x^2 + 7$$

Linear Equations:

21. Solve:

$$x + 9 = 20$$

22. Solve:

$$3x - 5 = 16$$

23. Solve:

$$2x + 7 = 19$$

24. Find k , if: $(2, 3)$ satisfies:

$$x + y = k$$

25. Convert into standard form:

$$2x + 5 = 9$$

Univariate Polynomials:

26. Identify whether: $x^2 + 5x + 1$ is univariate?

27. Identify variables in: $7a^2 + 3a + 1$

28. Is: $x + y$ univariate?

29. Find degree: $4y^3 + 2y + 1$

30. Arrange in standard form:

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

Linear Growth:

31. A plant is 10 cm tall and grows 3 cm every week. Write equation.
32. Ravi saves ₹500 every month. Initially he has ₹2000. Write equation.
33. Salary increases ₹1000 yearly from ₹25000. Write equation.
34. Water tank fills 5 liters every minute from 20 liters. Write equation.
35. Identify whether: 5, 10, 15, 20 shows linear growth?

Linear Decay:

36. A candle of 20 cm burns 2 cm every hour. Write equation.
37. A tank contains 100 liters and loses 5 liters every minute. Write equation.
38. Battery loses 10% charge every hour from 100%. Write equation.
39. Temperature decreases 2°C every hour from 30°C. Write equation.
40. Identify whether: 50, 45, 40, 35 shows linear decay?

Linear Pattern:

41. Find next two terms:

$$4, 8, 12, 16$$

42. Identify whether: 3, 6, 9, 12 is linear pattern.

43. Find common difference:

$$5, 10, 15, 20$$

44. Find next term:

7, 14, 21, 28

45. Identify pattern:

20, 18, 16, 14

Linear Relationship:

46. Find slope and intercept:

$$y = 3x + 2$$

47. State whether graph of:

$$y = 5x - 1$$

is straight or curved.

48. Find slope:

$$y = 7x + 4$$

49. Identify y-intercept:

$$y = 2x + 9$$

50. State whether:

$$y = x^2 + 1$$

shows linear relationship.

Answer Key

MCQs

- | | | |
|------|-------|-------|
| 1. b | 8. b | 15. c |
| 2. b | 9. c | 16. b |
| 3. c | 10. a | 17. c |
| 4. c | 11. b | 18. c |
| 5. d | 12. b | 19. b |
| 6. a | 13. c | 20. b |
| 7. b | 14. b | |
| 21. | | |

Fill in the Blanks

- | | |
|---------------|--------------|
| 1. algebraic | 11. fixed |
| 2. 7 | 12. 0 |
| 3. 2 | 13. pattern |
| 4. linear | 14. 3 |
| 5. quadratic | 15. y |
| 6. cubic | 16. 6 |
| 7. univariate | 17. 5 |
| 8. 1 | 18. positive |
| 9. line | 19. negative |
| 10. fixed | 20. constant |

True / False

- | | |
|----------|---------|
| 1. False | 2. True |
|----------|---------|

3. True

4. False

5. True

6. True

7. True

8. True

9. False

10. False

Statement Sum Answers

1. $x + 5$ 2. $2x - 7$ 3. $4y$ 4. $a - 10$ 5. $x + 9$

6. Coefficient = 7, Constant = 4

7. 3 terms

8. $3x + 8$ 9. Variable = a 10. $\frac{p}{2}$

Degree of Polynomials:

11. Degree = 3

12. Degree = 4

13. Degree = 2

14. Degree = 0

15. Linear polynomial

16. Quadratic polynomial

17. Cubic polynomial

18. Highest power = 6

19. No

20. Degree = 5

Linear Equations:

21. $x = 11$ 22. $x = 7$ 23. $x = 6$ 24. $k = 5$ 25. $2x - 4 = 0$

Univariate Polynomials:

26. Yes

27. Variable = a

28. No

29. Degree = 3

30. $-3x^3 + x^2 + x + 5$

Linear Growth:

31. $H = 3x + 10$

32. $S = 500x + 2000$

33. $S = 1000x + 25000$

34. $W = 5x + 20$

35. Yes

Linear Decay:

36. $L = -2x + 20$

37. $W = -5x + 100$

38. $B = -10x + 100$

39. $T = -2x + 30$

40. Yes

Linear Pattern:

41. 20, 24

42. Yes

43. 5

44. 35

45. Linear decay pattern

Linear Relationship:

46.

- Slope = 3
- Intercept = 2

47. Straight line

48. 7

49. 9

50. No

End of Chapter