MATHS

BOOKS - NAND LAL PUBLICATION

ALGEBRAIC EXPRESSIONS

Solutions Try These

1. Describe how the following expressions are obtained:

$$7xy + 5$$

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2. Describe how the following expressions are obtained:

$$x^2 y$$

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3. Describe how the following expressions are obtained:

$4x^2 - 5x$

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4. What are the terms in the following expression?

Show how the terms are formed. Draw a tree diagram for each expression: $8y + 3x^2$

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5. What are the terms in the following expression?

Show how the terms are formed. Draw a tree diagram for each expression: $7mn - 4$

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6. What are the terms in the following expression?

Show how the terms are formed. Draw a tree diagram for each expression: $2x^2y$

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7. Write three expressions each having 4 terms

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8. Identify the coefficients of the terms of the following expressions

$4x - 3y$

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9. Identify the coefficients of the terms of the following expressions

$a + b + 5$

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10. Identify the coefficients of the terms of the following expressions

$2y + 5$

11. Identify the coefficients of the terms of the following expressions

$2xy$

12. Group the like terms together from the following:

$12x, 12, -25x, -25, -25y, 1, x, 12y, y$

13. Classify the following expressions as a monomial, a binomial or a trinomial: x+3

14. Think of atleast two situations in each of which you need to form two algebraic expressions and add or subtract them:

15. Add and subtract

$$m - n, m + n$$

16. Add and subtract
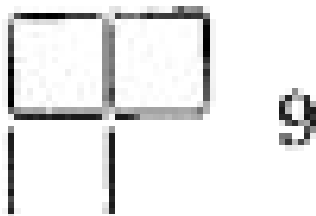
$$mn + 5 - 2, mn + 3$$

17. Make similar pattern with basic figures as shown
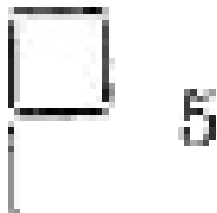
5

9

The letter P

18. Make similar pattern with basic figures as shown

$$\Box$$ 5,

$$\Box$$ 8
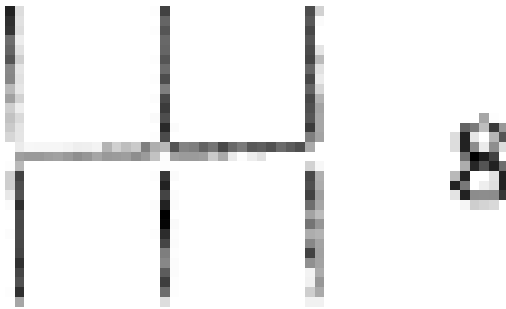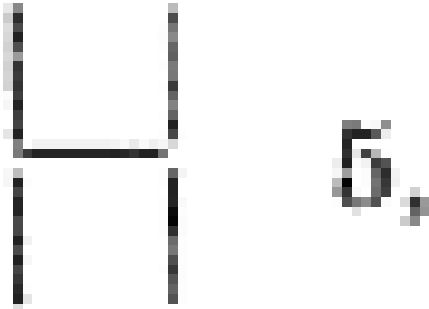
The letter H

1. Get the algebraic expressions in the following cases using variables, constants and arithmetic operations

.Subtraction of z from y.

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2. Get the algebraic expressions in the following cases using variables, constants and arithmetic operations

.One-half of the sum of numbers x and y.

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3. Get the algebraic expressions in the following cases using variables, constants and arithmetic operations

.The number z multiplied by itself.

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4. Get the algebraic expressions in the following cases using variables, constants and arithmetic operations.

One-fourth of the product of numbers p and q

5. Get the algebraic expressions in the following cases using variables, constants and arithmetic operations

.Numbers x and y both squared and added.

6. Get the algebraic expressions in the following cases using variables, constants and arithmetic operations

.Number 5 added to three times the product of numbers m and n.

7. Get the algebraic expressions in the following cases using variables, constants and arithmetic operations.

Product of numbers y and z subtracted from 10.

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8. Get the algebraic expressions in the following cases using variables, constants and arithmetic operations

Sum of numbers a and b subtracted from their product.

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9. Identify the terms and their factors in the following expressions Show the terms and factors by tree diagram

$x - 3$

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10. Identify the terms and their factors in the following expressions Show the terms and factors by tree diagram$1 + x + x^2$

11. Identify the terms and their factors in the following expressions Show the terms and factors by tree diagram,

$y - y^3$

12. Identify the terms and their factors in the following expressions Show the terms and factors by tree diagram

$5xy^2 + 7x^2y$

13. Identify the terms and their factors in the following expressions Show the terms and factors by tree diagram

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

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14. identify terms and factors in the expressions given below:

– 4x + 5y

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15. identify terms and factors in the expressions given below:

– 4x + 5y

▶ Watch Video Solution

16. identify terms and factors in the expressions given below:

$$5y + 3y^2$$

17. Identify the terms and factors in the expressions given below

$$xy + 3y^2$$

18. dentify terms and factors in the expressions given below:

pq + q

19. dentify terms and factors in the expressions given below:

1.2 ab – 2.4 b + 3.6 a

20. dentify terms and factors in the expressions given below:

$$\frac{3}{4}x + \frac{1}{4}$$

21. dentify terms and factors in the expressions given below:

$$0.1p^2 + 0.2q^2$$

22. Identify the numerical coefficients of terms (other than constants) in the following expressions

$$5 - 3t^2$$

23. Identify the numerical coefficients of terms (other than constants) in the following expressions

$1 + t + t^2 + t^3$

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24. Identify the numerical coefficients of terms (other than constants) in the following expressions

x + 2xy + 3y

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25. Identify the numerical coefficients of terms (other than constants) in the following expressions

$100m + 1000n$

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26. Identify the numerical coefficients of terms (other than constants) in the following expressions

$-p^2q^2 + 7pq$

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27. Identify the numerical coefficients of terms (other than constants) in the following expressions

1.2 a + 0.8 b

> ▶ Watch Video Solution

28. Identify the numerical coefficients of terms (other than constants) in the following expressions

$3.14r^2$

> ▶ Watch Video Solution

29. Identify the numerical coefficients of terms (other than constants) in the following expressions

2 (l + b)

> ▶ Watch Video Solution

30. Identify the numerical coefficients of terms (other than constants) in the following expressions

$0.1y + 0.01y^2$

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31. Identify terms which contain x and give the coefficient of x.

$y^2x + y$

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32. Identify terms which contain x and give the coefficient of x.

$$13y^2 - 8yx$$

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33. Identify terms which contain x and give the coefficient of x.

x + y + 2

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34. Identify terms which contain x and give the coefficient of x.

5 + z + zx

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35. Identify terms which contain x and give the coefficient of x.

1 + x + xy

36. Identify terms which contain x and give the coefficient of x.

$$12xy^2 + 25$$

37. Identify terms which contain x and give the coefficient of x.

$$7x + xy^2$$

38. Identify terms which contain y2 and give the coefficient of y^2

$$8 - xy^2$$

39. Identify terms which contain y^2 and give the coefficient of y^2

$5y^2 + 7x$

40. Identify terms which contain y^2 and give the coefficient of y^2

$2x^2y - 15xy^2 + 7y^2$

41. Classify into monomials, binomials and trinomials

$4y - 7z$

42. Classify into monomials, binomials and trinomials

y^2

43. Classify into monomials, binomials and trinomials

x + y – xy

44. Classify into monomials, binomials and trinomials

100

45. Classify into monomials, binomials and trinomials

ab – a – b

46. Classify into monomials, binomials and trinomials

5 – 3t

47. Classify into monomials, binomials and trinomials

$4p^2q - 4pq^2$

48. Classify into monomials, binomials and trinomials

7mn

49. Classify into monomials, binomials and trinomials

$z^2 - 3z + 8$

50. Classify into monomials, binomials and trinomials

$$a^2 + b^2$$

51. Classify into monomials, binomials and trinomials

$$z^2 + z$$

52. Classify into monomials, binomials and trinomials

$$1 + x + x^2$$

53. State whether a given pair of terms is of like or unlike terms.

1, 100

54. State whether a given pair of terms is of like or unlike terms.

$-7x, \dfrac{5}{2}x$

55. State whether a given pair of terms is of like or unlike terms.

– 29x, – 29y

56. State whether a given pair of terms is of like or unlike terms.

14xy, 42yx

57. State whether a given pair of terms is of like or unlike terms.

$4m^2p,\ 4mp^2$

58. State whether a given pair of terms is of like or unlike terms.

$12xz,\ 12x^2z^2$

59. Identify like terms in the following

$-xy^2,\ -4yx^2,\ 8x^2,\ 2xy^2,\ 7y,\ -11x^2,\ -100x,\ -11yx,\ 20x^2y,\ -6x^2,\ y,\ 2xy,\ 3x$

60. Identify like terms in the following

$$10pq,\ 7p,\ 8q,\ -p^2q^2,\ -7qp,\ -100q,\ -23,\ 12q^2p^2,\ -5p2,\ 41,\ 2405p,\ 78qp,\ 13p^2q,\ q$$

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Exercise 12 2

1. Simplify combining like terms:

21b – 32 + 7b – 20b

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2. Simplify combining like terms:

$$-z^2 + 13z^2 - 5z + 7z^3 - 15z$$

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3. Simplify combining like terms:

p – (p – q) – q – (q – p)

4. Simplify combining like terms:

3a – 2b – ab – (a – b + ab) + 3ab + b – a

5. Simplify combining like terms:

$$5x^2y - 5x^2 + 3yx^2 - 3y^2 + x^2 - y^2 + 8xy^2 - 3y^2$$

6. Simplify combining like terms:

$$\left(3y^2 + 5y - 4\right) - \left(8y - y2 - 4\right)$$

7. ਜੋੜੇ:- $3mn, \ -5mn, 8mn, \ -4mn$

8. Add:

t – 8tz, 3tz – z, z – t

9. Add:

– 7mn + 5, 12mn + 2, 9mn – 8, – 2mn – 3

10. Add:

a + b − 3, b − a + 3, a − b + 3

11. Add:

14x + 10y − 12xy − 13, 18 − 7x − 10y + 8xy, 4xy

12. Add:

5m − 7n, 3n − 4m + 2, 2m − 3mn − 5

13. Add:

$4x^2y, -3xy^2, -5xy^2, 5x^2y$

14. Add

$$3p^2q^2 - 4pq + 5, \, -10p^2q^2, \, 15 + 9pq + 7p^2q^2$$

15. Add

ab – 4a, 4b – ab, 4a – 4b

16. Add

$$x^2 - y^2 - 1, \, y^2 - 1 - x^2, \, 1 - x^2 - y^2$$

17. Subtract:

$-5y^2$ from y^2

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18. Subtract:

6xy from –12xy

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19. Subtract:

(a – b) from (a + b)

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20. Subtract:

a (b – 5) from b (5 – a)

21. Subtract:

$-m^2 + 5mn$ from $4m^2 - 3mn + 8$

22. Subtract:

$-x^2 + 10x - 5$ from $5x - 10$

23. Subtract:

$5a^2 - 7ab + 5b^2$ from $3ab - 2a^2 - 2b^2$

24. Subtract:

$4pq - 5q^2 - 3p^2$ from $5p^2 + 3q^2 - pq$

25. What should be added to $x^2 + xy + y^2$ to obtain $2x^2 + 3xy$?

26. What should be subtracted from 2a + 8b + 10 to get – 3a + 7b + 16?

27. What should be taken away from $3x^2 - 4y^2 + 5xy + 20$ to obtain $-x^2 - y^2 + 6xy + 20$?

28. From the sum of 3x – y + 11 and – y – 11, subtract 3x – y – 11.

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29. From the sum of 4 + 3x and $5 - 4x + 2x^2$, subtract the sum of $3x^2 - 5x$ and $-x^2 + 2x + 5$.

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Exercise 12 3

1. If m = 2, find the value of:

m – 2

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2. If m = 2, find the value of:

3m − 5

3. If m = 2, find the value of:

9 − 5m

4. If m = 2, find the value of:

$3m^2 - 2m - 7$

5. If m = 2, find the value of:

$$\frac{5m}{2} - 4$$

6. If p = – 2, find the value of

4p + 7

7. If p = – 2, find the value of

$$- 3p^2 + 4p + 7$$

8. If p = – 2, find the value of

$$- 2p^3 - 3p^2 + 4p + 7$$

9. Find the value of the following expressions, when x = –1:

2x – 7

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10. Find the value of the following expressions, when x = –1:

– x + 2

▶ Watch Video Solution

11. Find the value of the following expressions, when x = –1:

$x^2 + 2x + 1$

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12. Find the value of the following expressions, when x = –1:

$2x^2 - x - 2$

13. If a = 2, b = – 2, find the value of:

$$a^2 + b^2$$

14. If a = 2, b = – 2, find the value of:

$$a^2 + ab + b^2$$

15. If $a = 2, b = -2$ find the value of

$$a^2 - b^2$$

16. When a = 0, b = – 1, find the value of the given expressions

2a + 2b

17. When a = 0, b = – 1, find the value of the given expressions

$2a^2 + b^2 + 1$

18. When a = 0, b = – 1, find the value of the given expressions

$2a^2b + 2ab^2 + ab$

19. When a = 0, b = – 1, find the value of the given expressions

$a^2 + ab + 2$

20. Simplify the expressions and find the value if x is equal to 2

x + 7 + 4 (x – 5)

21. Simplify the expressions and find the value if x is equal to 2

3 (x + 2) + 5x – 7

22. Simplify the expressions and find the value if x is equal to 2

6x + 5 (x – 2)

23. Simplify the expressions and find the value if x is equal to 2

4(2x − 1) + 3x + 11

24. Simplify these expressions and find their values if x = 3, a = − 1, b = − 2

3x − 5 − x + 9

25. Simplify these expressions and find their values if x = 3, a = − 1, b = − 2

2 − 8x + 4x + 4

26. Simplify these expressions and find their values if x = 3, a = − 1, b = − 2

3a + 5 − 8a + 1

27. Simplify these expressions and find their values if x = 3, a = – 1, b = – 2

10 – 3b – 4 – 5b

28. Simplify these expressions and find their values if x = 3, a = – 1, b = – 2

2a – 2b – 4 – 5 + a

29. If z = 10, find the value of $z^3 - 3(z - 10)$.

30. If p = – 10, find the value of $p^2 - 2p - 100$

31. What should be the value of a if the value of $2x^2 + x - a$ equals to 5, when x = 0?

32. Simplify the expression and find its value when a = 5 and b = − 3.
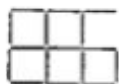
$2(a^2 + ab) + 3 - ab$

Exercise 12 4

1. Observe the patterns of digits made form line segments of equal length. You will find such segmented digits on the display of electronic watches or calculators.

6	11	16	21	(5n + 1) ...

How many segments are required to from 5, 10, 100 digits of the kind 6, 4, 8?
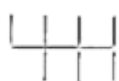
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2. Observe the patterns of digits made form line segments of equal length. You will find such segmented digits on the display of electronic watches or calculators.

4	7	10	13	(3n + 1)...

How many segments are required to from 5, 10, 100 digits of the kind 6, 4, 8?

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3. Observe the patterns of digits made form line segments of equal length. You will find such segmented digits on the display of electronic watches or calculators.
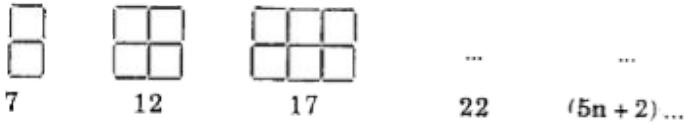

| 7 | 12 | 17 | 22 | $(5n+2)...$ |

How many segments are required to from 5, 10, 100 digits of the kind 8?

4. Use the given algebraic expression to complete the table of number patterns.

S. No.	Expression	Terms									
		1st	2nd	3rd	4th	5th	...	10th	...	100th	...
(i)	$2n-1$	1	3	5	7	9	-	19	-	-	-
(ii)	$3n+2$	5	8	11	14	-	-	-	-	-	-
(iii)	$4n+1$	5	9	13	17	-	-	-	-	-	-
(iv)	$7n+20$	27	34	41	48	-	-	-	-	-	-
(v)	n^2+1	2	5	10	17	-	-	-	-	10,001	-

1. An algebraic expession having two unlike terms is called _

2. Fill in the blanks.

Symbol having fixed numerical value is called _____.

3. $-ab - (-4ab)$ is equal to $\underline{3ab}$.

4. Parts of the expression separated by + or - sign are called _ of the expression.

5. _ is subtracted from $3x^2y$ to get $-7x^2y$.

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6. Symbol which can take different values is called a _____

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1. An expression contains two terms is called Trinomial.

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2. Unlike terms of the expression can be added or subtracted.

3. Numerical coefficient of $-11x^2yz$ is -11.

4. Perimeter of equilateral triangle with side 2l is 6l

5. The value of x^2 is equal to 8 for $x = 4$.

6. Factors of the term $-8x^2y^2$ is

1. Write the following statements as formulas

Perimeter of a square is 4 times the length of its side.

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2. Write the following statements as formulas

Sum of the three interior angles of a triangle is $180°$.

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3. Write the following statements as formulas

Area of the parallelogram is the product of its base and altitude.

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4. Write the following statements as formulas

Area of the circle is π times the square of its radius.

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5. Write the following statements as formulas

Area of the triangle is half the product of its base and height

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6. Write the following statements as formulas

Perimeter of the circle is π times the diameter

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Additional Questions Or Practice Objective Type Questions Short Answer Type Questions

1. Change the following algebraic expression to statement in words.

$4(x - y)$

2. Change the following algebraic expression to statement in words.

$x \times y + 2$

3. Change the following algebraic expression to statement in words.

$\frac{1}{2}\left(a^2 + b^2\right)$

4. Change the following algebraic expression to statement in words.

$\frac{x + 3y}{2}$

5. Change the following algebraic expression to statement in words.

$$\frac{x}{y} - 2$$

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6. If two adjacent sides of the parallelogram are $(3x + 5y)$ and $(2y - x)$ then find its perimeter.

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7. Ishan spends rupees x and saves rupees y per week. What is his income after 2 years ?

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8. If r be the radius of a circle. If the diameter is decreased by 1 unit, then what is the perimeter of the new circle formed?

9. What must be added to $3x^2 - 5x + 7$ to obtain $2x^2 - 8x + 9$.

10. What must be subtracted from $x^2 - 2x^3 + 5x + 7$ to obtain $3x^2 + 8 + 2x^3 - 5x$

11. How much $-3x^2 + 5y + 8$ exceeds $5x^2 - y + 7$

1. From the sum of $5x^2 - 3x + 7$ and $2x - 8x^2 + 5$ subtract the sum of $13x + 9x^2 + 6$ and $x^2 - 4x + 1$

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2. Find the value of $a^3 + a^3b + b^3 + ab^2$
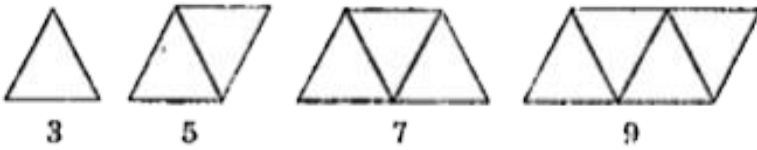
$a = -1, b = 1$

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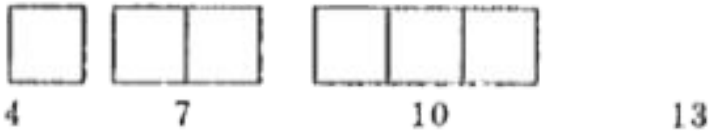**3.** Find the value of $a^3 + a^3b + b^3 + ab^2$

$a = -2, b = -1$
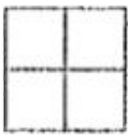
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4. Observe the pattern of the shapes given and write down the algebraic rule for each pattern for the nth stage

3   5   7   9

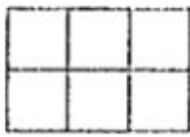**5.** Observe the pattern of the shapes given and write down the algebraic rule for each pattern for the nth stage

4   7   10   13

6. Observe the pattern of the shapes given and write down the algebraic rule for each pattern for the nth stage
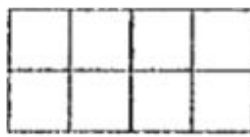
7	12	17	22

Additional Questions Or Practice Objective Type Questions Hots

1. Write the algebraic expression for the following statement :

The subtraction of the sum of 'a' and 2 from 'b' is added '7a' and its difference from 'a' is subtracted from b

Sample Paper For Practice Fill In The Blanks

1. The number of unlike terms in the algebraic expression $8a^2 - 5ab + 5a^2$ is ....

2. One apple weighs 60 g and orange 40 g. The weight of x apples and y oranges is ....

3. Numerical factor of a term is called ....

4. Coefficient of xy^2 in $-10x^2y - 2xy^2z$ is ....

5. If $p = -1$ then $p^2 - 2p - 4 =$ ....

6. Monomial contain only .... Term

1. On adding 3x and 5y we get 8xy

2. $-4xy, 3yx$ are like terms

3. The number of terms in an expression $4x + 9$ is 3

4. On subtracting 8xy from 5xy, we get 8 xy

5. Perimeter of the rectangle whose sides measure 3x, y is 3xy

6. The symbol which takes various numerical values is called the constant

Sample Paper For Practice

1. Match the following

(a) Trinomial — a², 2a²
(b) 6x³y − 5xyz² — x² − xy − 4
(c) Coefficient of x in − 5x — Number of terms are 2
(d) Like terms in a², 2b², 2a², y³ — 10, a, a, b, c
(e) Constant term is − 5x²y³ — − 5
(f) factors of the term −10a²bc are — 0

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2. Distance between Place A and Place B is $(4x - 3)km$. A bus started from A and covered $(3x + 1)km$ in 1 hour. How much distance is still left to cover?

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3. The sides of the triangle are $(11 - 5x), (2x + 8)$ and $(3x + 2)$. Find the perimeter of this triangle.

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4. How much is $3x^2 - 7xy + 5y^2 + 2$ greater than $3x^2 - 3y^2 + 9xy + 4$?

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5. How much less is $2p - 3q + r$ than $3p + 4q - 6r$?

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6. Consider the expression $3p^2q - 2pq^2 + 6p^3q^2$.

How many terms are there in the expression?

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7. Consider the expression $3p^2q - 2pq^2 + 6p^3q^2$.

Write all the terms of the expression.

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8. Consider the expression $3p^2q - 2pq^2 + 6p^3q^2$.

Write the numerical coefficient of each them.

9. Consider the expression $3p^2q - 2pq^2 + 6p^3q^2$.

Write the numerical coefficient of each them.

10. If $A = 3x^2 - 2x + 1$

$B = x^2 - 4x + 6$

$C = -2x^2 + 5$, Find $A - 2B + 3C$