

NOTES

CLASS 7

MATHS

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ALGEBRAIC EXPRESSIONS

I. Important Concepts/Result

1. Algebraic expression are formed from variables and constants using operations of addition, subtraction, multiplication and division.
2. Terms are added to make an expression.
3. A term is a product of algebraic factors.
4. The coefficient is the numerical factor in the term.
5. Sometimes any one factor in the term is called the coefficient of the remaining part of the term.
6. An expression with one term is called monomial, a two term expression is a binomial, a 3- term expression is a trinomial. Any expression with one or more term is called polynomial.
7. Terms having same algebraic factors are like terms. Terms having different algebraic factors are unlike terms.
8. The value of an expression depends on the value of the variable in the expression.

II. Some Illustrations/Examples

(i) MCQ

1. A polynomial with one term is called
(a) Monomial (b) Binomial (c) Trinomial (d) None of the above
2. What is the coefficient of x in the expression $7x + 4y - 3z$
(a) 7 (b) 4 (c) -3 (d) 3
3. Which of the following terms is an unlike term
(a) $3x$ (b) $2x^2$ (c) $-4x$ (d) $10x$
4. Which of the following is not a monomial
(a) $3x$ (b) $12x^2$ (c) $3x + 4$ (d) $7y$



II. Case Study based Question



A Maths test was conducted in class 7 to assess the learning of the students. So the teacher made some statements and the students were asked to express it algebraically.

(i) One third of the product of x and y. (1 mark)

(ii) A number multiplied by itself. (1 mark)

(iii) Sum of two number x and y subtracted from their product. (2 marks)

Solution: (i) $\frac{1}{3} \times x \times y = \frac{xy}{3}$

(ii) $x \times x = x^2$

(iii) $x \times y - (x + y)$
 $= xy - (x + y)$

III. Short Answer type Question

1. State whether the given pair of terms is like or unlike

(a) $2x$, $3y$

(b) $14xy$, $2yx$

Answer (a) Unlike (b) Like

2. Write the coefficient of y in the expression $7xy + 2x$

Answer $7x$

3. Find the value of the expression $2x + 3$ for $x = -2$

Answer: $2x + 3 = 2(-2) + 3 = -4 + 3 = -1$



IV. Long Answer Type Question

1. Simplify the expression and find the value of if $x = 2$, $y = -1$

$$6x + 5(y-1)$$

Solution: $6x + 5(y-1)$

$$= 6x + 5y - 5$$

$$= 6(2) + 5(-1) - 5$$

$$= 12 - 5 - 5$$

$$= 12 - 10$$

$$= \underline{2}$$

2. If $z = 10$ then find the value of $z^2 - 5(z-3)$

Solution $z^2 - 5(z-3)$

$$= z^2 + 5z + 15$$

$$= 10 \times 10 - 5 \times 10 + 15$$

$$= 100 - 50 + 15$$

$$= 115 - 50 = 65$$

Questions for Practice

M C Q

1. How many terms are there in a trinomial
(a)1 (b)2 (c)3 (d)4
2. Coefficient of Y in the expression $4X - 2Y + z$ is
(a)4 (b) 2 (c) -2 (d) 1
3. Which of the following expression is a binomial
(a) $2X + 1$ (b) $3Y + z$ (c) none of the above (d) both a and b
4. How many terms are there in a monomial
(a) 1 (b) 2 (c) 3 (d)4
5. which of the following expression is unlike term
(a) $2x$ (b) $-7x$ (c) $8XY$ (d) $15x$
6. Numerical Coefficient in the expression $-8xyz$ is
(a)x (b)y (c) z (d) -8
7. The sum or difference of 2 like terms is
(a)like term (b)unlike term (c) both a and b. (d) none of the above
8. In the formula for area of a circle the numerical constant in the expression is
(a) π (b) $22/7$. (c) 3.14 (d)all the above are correct
9. Find the value of $17x - y$ for $x=1$ and $y= -3$
(a) 17 (b) 20 (c) -17 (d) -20
10. Evaluate $3x^2 + 2$ for $x=1$
(a)3 (b)5 (c) 2. (d)0



Short Answer Type Questions

1. State which of the following pairs of terms are like and which are unlike terms.
(i) $-3X$ and $-5Y$ (ii) $7XY$ and $-2YX$
2. Give an algebraic expression for - product of numbers X and Y subtracted from 17.
3. Give an algebraic expression for - Number 3 added to 5 times the product of numbers m and n.
4. Identify the terms and factors in the expression $7x + 15yz$.
5. Identify the term with factor y and write the Coefficient of y in the expression $18 + yz$.

6. Identify the numerical Coefficients of the terms of the expression $2m+7pq-5x$.
7. Find the value of the expression $20-4x^2$ for $x = 1$.
8. Find the value of the expression $10x^2-100$ for $x= 9$.
9. Find the value of the expression $7a - 4b$ for $a=2, b=1$
10. Find the value of $3n^2-2n$ for $n= -1$

Long Answer Type Questions

1. Simplify the expression. $x+8+2(x-5)$ and then find its value for $x=3$.
2. What should be the value of 'a' if the value of $3x^2- a+x$ is 10 when $x = 5$
3. If $a = 0$ and $b = -1$, find the value of
 - (i) $a+b$.
 - (ii) a^2+b^2
4. Express algebraically -
The number of scarfs of length half meter that can be made from Y meters of cloth.
5. The length of a side of a square is given as $2x+3$. What will be the algebraic expression for its perimeter.
6. Write two different algebraic expressions for the word phrase : $-\frac{1}{4}$ the sum of x and 7.

Case Study Based Questions

1.



National association for the blind (NAB) aimed to empower and well inform visually challenged population of our country, thus enabling them to lead a life of dignity and productivity.

Meera donates ₹ $(x+y)$ to NAB. Total (x^2-y^2) students donated. ₹ $(x-y)$ each for the help of blind people.

- (a) what will be the total amount donated by all students. (1 mark)
- (b) Meera donated ₹ $(x+y)$ and Sheena donated ₹ $(3x - 4y)$. What is the total money donated by both of them. (1 mark)



(c) If $x = 5$ and $y = -3$ then what will be the total amount donated by all students. (2 marks)

2.



Mr. Arun Kumar bought a rectangular plot of length x and breadth y . But when his mother was ill, he needed money for her treatment so he sold a small triangular part of land off base length y and height z .

- (a) What is the area of rectangular plot. (1 mark)
 (b) What is the area of triangular plot sold. (1 mark)
 (c) Find the area of the remaining part of the plot. (2 marks)

ANSWERS

MCQ

- | | | |
|-------|------|------|
| 1) c | 2) c | 3) d |
| 4) a | 5) c | 6) d |
| 7) a | 8) d | 9) a |
| 10) b | | |

Short Answer Type Questions

- | | | | |
|--------------------------|---------------|------------|---------------------------------------|
| 1) (i) unlike. (ii) like | 2) $17-xy$ | 3) $3+5mn$ | 4) $7x, 15yz$. and. $7, x; 15, y, z$ |
| 5) $yz; z$ | 6) $2, 7, -5$ | 7) 16 | 8) 710 |
| 9) 10 | 10) 5 | | |

Long Answer Type Questions

- | | | | | | |
|--------|---------|------------|-------------|------------|---|
| 1) 7 | 2) 70 | 3) a) -1 | b) $14) 2y$ | 5) $8x+12$ | 6) $\frac{1}{4}(x+7); \frac{1}{4}(7+x)$ |
|--------|---------|------------|-------------|------------|---|

Case Study Based Questions

- 1) a) $(x^2-y^2)(x-y)$ b) $x+y+3x-4y=4x-3y$ c) 128

- | | | |
|------------|----------------------|---|
| 2) a) xy | b) $\frac{1}{2}yz$. | c) $xy - \frac{yz}{2} = y[x - \frac{z}{2}]$ |
|------------|----------------------|---|



CHAPTER TEST 1MM. 20

Note: Q1 to 4 are of 1 mark each. Q5 to 8 are of 2 marks each. Q 9 and 10 are of 4 marks each.

1. How many terms are there in a binomial
a) 1 b) 2 c) 3 d) 4
2. Coefficient of x in the expression. $-3xyz$. is
a) -3 b) -3y c) $-3yz$ d) $-3xyz$
3. One fourth of the product of m and n may be expressed as
a) $\frac{mn}{4}$ b) $\frac{m+n}{4}$ c) $4mn$ d) $4(m+n)$
4. Find the value of $m-2$ for $m = -5$
a) -5 b) -2. c) -7. d) 7
5. Give one example each of a monomial and a binomial.
6. The length and breadth of a rectangle is $2x$ and $3y$ respectively give an expression for its perimeter.
7. Find the value of $2m^2+3m-1$ for $m = -1$
8. Find the value of $7xyz-2$ for $x=0, y=1, z=2$.

Case Study Based Question

9.



In a test of mathematics for class 7, the teacher Wrote the following statements on the blackboard for which the students were required to give algebraic expression. What expression will you give for.

- a) 10 times X subtracted from 5. (1 mark)
 - b) one half of the sum of x and y. (1 mark)
 - c) 2 times the product of X and Y subtracted from 3 times the sum of x and y. (2marks)
10. Which of the following are like terms.

$4x, -2y, -3x^2, 14x, 7xy, 4yx, 100x^2, 2y^2x, 13x^2y, -10xy^2, -4x^2y, 10y$

TEST 2

ALGEBRAIC EXPRESSION

MM. 20

Note: Q 1 to 6 are of 1mark each, Q 7 to 9 are of 2 marks each, Q 10 and 11 are of 3 marks each.

Q 12 and 14 are of 4 marks each.

1. How many terms are there in a trinomial
a)1 b) 2 c) 3 d) 4
2. Two third of the product of x and z is
a) $\frac{2}{3}xz$ b) $\frac{3}{2}xz$ c) $\frac{2}{3}(x+z)$ d) $\frac{3}{2}(x+z)$
3. Find the value of $x-5$ for $x = -2$
a) -5. b) -2. c)-7 d)0
4. Find the value of $xy+yz+zx$ for $x=0, y=1, z=2$.
a)0 b)1 C)2 d)3
5. Coefficient of xy in the expression $-12xyz$ is
a)-12 b)-12x c) -12y d) -12z
6. Which of the following is a binomial
a) $2x$. b) $2x+3y$. c) $2x +3y+4z$. d) none of the above
7. Give one example each of a binomial and a trinomial
8. The length of base of a triangle is $3x$. and corresponding height is y . Give an expression for its area.
9. Evaluate $3x^2+2y-1$, for $x=1, y=2$.
10. What should be the value of a, if the value of $3x+2y-a=10$ for $x=1, y=-2$.
11. If $z=10$, find the value of $z^3-2(z+5)$.
12. Give algebraic expressions for
a) 7 times x multiplied to the sum of y and z b) 4 times z subtracted from the product of x and y.
13. Which of the following are like terms
 $17x, -3y, -4x^2, 17x, 3xy, 15x^2, 7yx, 8y$

Case Study Based Question

14. Mr. Mohan Singh owns a square plot of side $7x$ units. His brother Mr. Sohan Singh wishes to go abroad for which he needed a lot of money, so he decides to sell his small rectangular plot of length $7x$ units and breadth $5y$



units to brother Mohan. Mr. Mohan is happy to give money in lieu of Sohan's plot as Sohan's plot is just adjoining to his own one

- a) what is the area of Mr. Mohan's plot. (1 mark)
- b) what is the area of Mr. Sohan's plot. (1 mark)
- c) what is the perimeter of the combined plot of Mr. Mohan and Sohan. (2 marks)





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