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ALGEBRAIC EXPRESSIONS (ANSWERS)

SUBJECT: MATHEMATICS

CLASS : VII

MAX. MARKS : 40

DURATION : $1\frac{1}{2}$ hr

General Instructions:

- (i). All questions are compulsory.
- (ii). This question paper contains 20 questions divided into five Sections A, B, C, D and E.
- (iii). Section A comprises of 6 MCQs of 1 mark each. Section B comprises of 1 CCT question of 4 marks each which contains 4 MCQs. Section C comprises of 3 questions of 2 marks each. Section D comprises of 4 questions of 3 marks each and Section E comprises of 3 questions of 4 marks each.

$\frac{\text{SECTION} - A}{1}$

Questions 1 to 6 carry 1 mark each. 1. The sum of $x^4 - xy + 2y^2$ and $-x^4 + xy + 2y^2$ is (a) Monomial and polynomial in y (b) Binomial and Polynomial (c) Trinomial and polynomial (d) Monomial and polynomial in x Ans: (a) Monomial and polynomial in y Consider the given equation, $x^4 - xy + 2y^2$ and $-x^4 + xy + 2y^2$ Sum of two expressions = $(x^4 - xy + 2y^2) + (-x^4 + xy + 2y^2)$ = $x^4 - xy + 2y^2 - x^4 + xy + 2y^2 = (x^4 - x^4) + (-xy + xy) + (2y^2 + 2y^2)$ $= 0 + 0 + 4y^2 = 4y^2$ 2. Which of the following is a pair of like terms? $(b) - 10xyz^2$, $3xyz^2$ (a) $-7xy^2z$, $-7x^2yz$ (c) 3xyz, $3x^2y^2z^2$ (d) $4xyz^2$, $4x^2yz$ Ans: (d) $-9y^2z$ Coefficient is the numerical factor in a term. Sometimes, any factor in a term is called the coefficient of the remaining part of the term. 3. The side length of the top of square table is x. The expression for perimeter is: (a) 4 + x(b) 2x (c) 4x(d) 8x Ans: (c) 4xWe know that, perimeter of the square = $4 \times \text{side}$ From the question it is given that, side length of the top of square table is x. Then, perimeter = $4 \times x = 4x$ 4. What must be subtracted from 2a + b to get 2a - b(a) 2b (b) 4a (d) 4a + 4b(c) 0Ans: (a) 2b $2a + b - x = 2a - b \Rightarrow x = 2a + b - 2a + b = 2b$ 5. The value of $3x^2 - 5x + 3$ when x = 1 is (a) 1 (d) 11 (b) 0(c) - 1Ans: (a) 1 Substitute the value of x in the expression $3x^2 - 5x + 3$ $= (3 \times (1)^2) - (5 \times 1) + 3 = 3 - 5 + 3 = 6 - 5 = 1$ 6. The value of 21b - 32 + 7b - 20b is (a) 48b - 32(b) -8b - 32 (c) 8b - 32(d) 28b - 52Ans: (c) 8b - 32(21b + 7b - 20b) - 32= b (21 + 7 - 20) - 32 = b (28 - 20) - 32 = b (8) - 32 = 8b - 32

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SECTION – B(CCT Questions)

Questions 7 to 10 carry 1 mark each.

CCT Question

In Class VII-A, one day Maths teacher explaining the topic formation of algebraic expression and find the value of expression. He explained that Variables and numbers are used to construct terms. These terms along with a combination of operators constitute an algebraic expression. The algebraic expression has a value that depends on the values of the variables. He explained example, let $6p^2-3p+5$ be an algebraic expression with variable p

The value of the expression when p = 2 is, $6(2)^2 - 3(2) + 5$ $\Rightarrow 6(4) - 6 + 5 = 23$

Answer the following questions based on the above information:

7.	The value of expression $4x - 3$ at $x = 2$ is				
	(a) -4 Ans: (b) 5	(b) 5	(c) 4	(d) 2	
8.	The value of expression	$5n^2 + 5n - 2$ for $n = -$	-2 is		
	(a) 13 Ans: (c) 8	(b) 3	(c) 8	(d) 12	
9.	The value of expression	$2a^2 + 2b^2 - ab$ for $a = 2$	2, b = 1 is		
	(a) 2 Ans: (b) 8	(b) 8	(c) 6	(d) 10	
10	The value of $x + 7 + 4(x)$	(x - 5) for $x = 2$			
_ 0	(a) -3	(b) 31	(c) 12	(d) 37	

<u>SECTION – C</u>

Questions 11 to 13 carry 2 marks each.

- **11.** Get the algebraic expressions in the following cases using variables, constants and arithmetic operations.
 - (i) Numbers x and y, both squared and added
 - (ii) Number 5 added to three times the product of numbers m and n
 - (iii) Product of numbers y and z subtracted from 10
 - (iv) Sum of numbers a and b subtracted from their product.
 - Ans: (i) Numbers x and y, both squared and added = $x^2 + y^2$
 - (ii) Number 5 added to three times the product of numbers m and n = 3mn + 5
 - (iii) Product of numbers y and z subtracted from $10 = 10 (y \times z) = 10 yz$

(iv) Sum of numbers a and b subtracted from their product = $(a \times b) - (a + b)$ = ab - (a + b)

12. Identify like terms in the following: 10pq, 7p, 8q, $-p^2q^2$, -7qp, -100q, -23, $12q^2p^2$, $-5p^2$, 41, 2405p, 78qp, $13p^2q$, qp^2 , $701p^2$

Ans: When terms have the same algebraic factors, they are like terms.

They are, 10pq, - 7qp, 78qp 7p, 2405p

8q, -100q $-p^2q^2, 12q^2p^2$ -23, 41

Ans: (a) -3

$$-5p^2$$
, 701p²

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13. Simplify combining like terms: 3a - 2b - ab - (a - b + ab) + 3ab + b - aAns: 3a - 2b - ab - (a - b + ab) + 3ab + b - a = 3a - 2b - ab - a + b - ab + 3ab + b - a = 3a - a - a - 2b + b + b - ab - ab + 3ab = a (1 - 1 - 1) + b (-2 + 1 + 1) + ab (-1 - 1 + 3) = a (1 - 2) + b (-2 + 2) + ab (-2 + 3)= a (1) + b (0) + ab (1) = a + ab

<u>SECTION – D</u> Questions 14 to 17 carry 3 marks each.

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

From the question, it is given that x = 0We have, $2x^2 + x - a = 5 \Rightarrow a = 2x^2 + x - 5$ Then, substitute the value of x in the equation. $a = (2 \times 0^2) + 0 - 5 \Rightarrow a = 0 + 0 - 5 \Rightarrow a = -5$

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

(i) $8 - xy^2$ (ii) $5y^2 + 7x$ (iii) $2x^2y - 15xy^2 + 7y^2$ Ans:

Sl.No.	Expression	Terms	Coefficient of y ²
(i)	$8 - xy^2$	$-xy^2$	- X
(ii)	$5y^2 + 7x$	$5y^2$	5
(iii)	$2x^2y - 15xy^2 + 7y^2$	$-15xy^{2}$	- 15x
		$7y^2$	7

16. Find the values of the following expressions for x = 2.

(i) x + 4 (ii) 4x - 3Ans: Putting x = 2(i) In x + 4, we get x + 4 = 2 + 4 = 6(ii) In 4x - 3, we get $4x - 3 = (4 \times 2) - 3 = 8 - 3 = 5$

17. Simplify the expression and find its value when a = 5 and b = -3. $2(a^2 + ab) + 3 - ab$ Ans: From the question, it is given that a = 5 and b = -3We have, $2a^2 + 2ab + 3 - ab = 2a^2 + ab + 3$ Then, substitute the value of a and b in the equation. $= (2 \times 5^2) + (5 \times (-3)) + 3 = (2 \times 25) + (-15) + 3$ = 50 - 15 + 3 = 53 - 15 = 38

<u>SECTION – E</u>

Questions 18 to 20 carry 4 marks each.

18. (i) If z = 10, find the value of z3 - 3(z - 10). (ii) If p = -10, find the value of p2 - 2p - 100Ans: (i) From the question, it is given that z = 10We have, $z^3 - 3z + 30$ Then, substitute the value of z in the equation. $= (10)^3 - (3 \times 10) + 30 = 1000 - 30 + 30 = 1000$ (ii) From the question, it is given that p = -10We have, $p^2 - 2p - 100$

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Then, substitute the value of p in the equation. = $(-10)^2 - (2 \times (-10)) - 100 = 100 + 20 - 100 = 20$

19. Identify the terms and their factors in the expressions: (i) $5xy^2 + 7x^2y$ (ii) $-ab + 2b^2 - 3a^2$ Show the terms and factors by tree diagrams.

