Girls' High School & College, Prayagraj

Session :2020-21

Class: 8 (A,B,C,D,E)

Subject : Mathematics

Worksheet : 08

INSTRUCTIONS : Parents kindly ensure that the student understands the given examples to solve the questions that follow. Students can also refer to class 6, 7 or 8 Maths book or internet.

TOPIC: ALGEBRAIC EXPRESSIONS (PART – 1)

(Including operations on algebraic expressions)

Example1: Find the degree of the polynomial:

   (i) $3x^2 – 8x + 4$.

   (ii) $7x^3y^4 - 8x^2y^3z^4 + 5x^4y^3z$

   Solution: (i) In polynomial $3x^2 – 8x + 4$, the term containing greatest power of the variable x is $3x^2$ and its power is 2. Therefore, degree of polynomial $3x^2 – 8x + 4$ is 2.

(ii)

   Consider the polynomial: $7x^3y^4 - 8x^2y^3z^4 + 5x^4y^3z$

   The sum of the powers of the term $7x^3y^4$= 3+4 = 7

   The sum of the powers of the term $– 8x^2y^3z^4$ = 2+ 3+ 4= 9

   The sum of the powers of the term $5x^4y^3z$ = 4+3+1=8

   Clearly, the degree of the polynomial is 9

Question 1: Write the degree of each polynomial given below:

i) $xy + 7z$

ii) $x^5y^7 - 8\,x^3y^8 + 10x^4y^4z^4$

Question 2: Write the degree of each polynomial given below:

(i) $xyz - 3$

(ii) $x^2 - 6x^3 + 8$

Question 3: Separate the constants and variables from the following:

-7 , 7 +x , 7x + yz ,3yz/8, 4.5y -3x , 8 -5 , 8 − 5x and $3y^2z \div 4x$

Example 2: Collect like and unlike terms from the following terms:

$-8xy^2$, x^2y, $6xy^2$, $15xy^2$, xy^3.

e.g.   i) $6xy^2$,$-8xy^2$, $15xy^2$ are all like terms

        ii) x^2y and xy^3 are unlike terms.

Question 4: Separate the like terms: $3xy$,$-4yx^2$,$2xy^2$,$2.5x^2y$,$-8yx$,$-3.2y^2x$ and x^2y.

Question 5: Write the number of terms in each of the following:

i) $5x^2$+3 × ax

ii)   ax – by

iii)   23+ a×b ÷2

iv)   ax – by + y×z

Question 6: Separate monomials , binomials, trinomials and polynomials from the following expressions:

i)   8 – 3x

ii)   3x ÷ 5y

iii)   2y÷7+3x – 7

Example 3. In the algebraic term 7xyz, find the coefficient of:

(i)   xyz   (ii) yz   (iii) z   (iv) 7y.

Solution: (i) 7 is the coefficient of xyz.

(ii)   7x is the coefficient of yz.
(iii)   7xy is the coefficient of z.
(iv)   xz is the coefficient of 7y.

Question 7: Write the coefficient of :

i) x^2 in $5x^2 – 5x$
ii)   y in $x^2 – 4xy + y^2$

Question 8: Write the coefficient of :

i)   ab in 7abx
ii)   8 in $a^2 – 8ax + a$

Example4: Add :6 – 3a + b; a-7-6b and 3b+2-a

 Solution: Arrange the polynomials with like terms one below the other, then   combine the like terms.

6 – 3a + b

-7 +a – 6b

+2 –a + 3b

1 – 3a -2b

Alternative method:

Addition of 6 – 3a + b; a – 7- 6b and 3b +2 –a

$$= (6-3a +b) + (a – 7 – 6b) + (3b + 2 – a)$$

$$= 6 – 3a +b +a – 7 – 6b + 3b + 2 – a$$

$$= -3a + a – a + b – 6b + 3b+6 – 7 +2$$

$$=-3a -2b +1$$

Question9. Add: 5a + 3b, a -2b,3a + 5b

Question 10. Add: 13ab – 9cd – xy, 5xy , 15cd – 7ab , 6xy -3cd

Question 11. Add: $x^3 –x^2y + 5xy^2 + y^3$, $-x^3 -9xy^2+ y^3$, $3x^2y + 9xy^2$

Example 5: Subtract : $5x- 3x^2+ 8xy$ from $7x^2 + 3xy – 4x$.

Solution: Arrange the polynomials with like terms one below the other. Change the signs of   each term to be subtracted and then combine the like terms.

$$7x^2 + 3xy – 4x$$

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

$$\underline{\quad +\quad -\quad\quad -\quad}$$

$$\underline{10x^2 - 5xy – 9x}$$

Alternative method:

Subtraction of $5x – 3x^2 + 8xy$ from $7x^2+ 3xy – 4x$

$$=(7x^2 + 3xy - 4x) - (5x - 3x^2 + 8xy)$$

$$= 7x^2 + 3xy - 4x -5x +3x^2 - 8xy$$

$$= 7x^2 + 3x^2 +3xy - 8xy -4x -5x$$

$$=10x^2 - 5xy - 9x$$

Question 12: Subtract : $3a - 5b + c + 2d$ from $7a - 3b + c - 2d$

Question 13: Subtract: $x^3 - 4x - 1$ from $3x^3 - x^2 + 6$

Example 6 : The perimeter of a triangle is $15x^2 - 23x + 9$ and two of its sides are $5x^2 + 8x - 1$ and $6x^2 - 9x + 4$.

Find the third side.

Solution: Since, the perimeter of a triangle = sum of the lengths of its three sides .

$$15x^2 - 23x + 9 = (5x^2 + 8x - 1) + (6x^2 - 9x + 4) +$$
third side

$$15x^2 - 23x + 9 = 11x^2 - x + 3 + \text{third side}$$

$$\text{The third side} = 15x^2 - 23x + 9 - 11x^2 + x - 3$$

$$=4x^2 - 22x + 6$$

Question 14: What must be added to $x^4 - x^3 + x^2 + x + 3$ to obtain $x^4 + x^2 - 1$?

Question 15: Subtract the sum of $5y^2 + y - 3$ and $y^2 - 3y + 7$ from $6y^2 + y - 2$.

Question 16: How much less $2a^2 + 1$ is than $3a^2 - 6$?

Question 17: What must be subtracted from $19x^4 + 2x^3 + 30x - 37$ to get $8x^4 + 22x^3 - 7x - 60$?

Question 18: The two adjacent sides of a rectangle are $2x^2 - 5xy + 3z^2$ and $4xy - x^2 - z^2$. Find its perimeter.

Question 19: If $x = 6a + 8b + 9c$; $y = 2b - 3a - 6c$ and $z = c - b + 3a$; find :

i) $x + y + z$ ii) $2x - y - 3z$.

Question 20: The three sides of a triangle are $x^2 - 3xy + 8$, $4x^2 + 5xy - 3$ and $6 - 3x^2 + 4xy$. Find its perimeter.

Question 21: How much bigger is $5x^2y^2 - 18xy^2 - 10x^2y$ than $-5x^2 + 6x^2y - 7xy$?

Question 22: Take away $-3x^3 + 4x^2 - 5x + 6$ from $3x^3 - 4x^2 + 5x - 6$.

Question 23: Find the total savings of a boy who saves Rs. $(4x - 6y)$, Rs. $(6x + 2y)$, Rs. $(4y - x)$ and Rs. $(y - 2x)$ in four consecutive weeks.

THE END