# KENDRIYA VIDYALAYA GACHIBOWLI, GPRA CAMPUS, HYD–32

## PRACTICE PAPER 02 (2023-24)

## ALGEBRAIC EXPRESSIONS AND IDENTITIES

## (ANSWERS)

**SUBJECT: MATHEMATICS** **MAX. MARKS : 30**

**CLASS : VIII** **DURATION : 1 hr**

## SECTION – A (1 mark)

**1.** If we add, 7xy + 5yz – 3zx, 4yz + 9zx – 4y and –3xz + 5x – 2xy, then the answer is:
(a) 5xy + 9yz +3zx + 5x – 4y (b) 5xy – 9yz +3zx – 5x – 4y
(c) 5xy + 10yz +3zx + 15x – 4y (d) 5xy + 10yz +3zx + 5x – 6y
Ans: (a) 5xy + 9yz +3zx + 5x – 4y
Given, 7xy + 5yz – 3zx, 4yz + 9zx – 4y and –3xz + 5x – 2xy.
If we add the three expressions, then we need to combine the like terms together.
(7xy – 2xy) + (5yz + 4yz) – 3zx + 9zx – 3xz – 4y + 5x
= 5xy + 9yz + 3zx + 5x – 4y

**2.** If we subtract 4a – 7ab + 3b + 12 from 12a – 9ab + 5b – 3, then the answer is:
(a) 8a+2ab+2b+15 (b) 8a+2ab+2b-15
(c) 8a-2ab+2b-15 (d) 8a-2ab-2b-15
Ans: (c) 8a-2ab+2b-15
(12a – 9ab + 5b – 3) – (4a – 7ab + 3b + 12)
= 12a – 9ab + 5b – 3 – 4a + 7ab -3b-12
= (12 – 4)a – (9 – 7)ab + (5 – 3)b – 3 – 12
= 8a – 2ab + 2b – 15

**3.** If we multiply 5x and (– 4xyz), then we get:
(a) $20x^2yz$ (b) $-20x^2yz$ (c) $x^2yz$ (d) -2xyz
Ans: (b) $-20x^2yz$
(5x) x (-4xyz) = 5 × x × (-4) × x × y × z = $-20x^{1+1}yz = -20x^2yz$

**4.** The volume of a cuboid with length, breadth and height as 5x, $3x^2$ and $7x^4$ respectively is:
(a) $105x^7$ (b) $105x^2$ (c) $105x^4$ (d) 105x
Ans: (a) $105x^7$

Volume of cuboid = Length × breadth × height
V = 5x × $3x^2$ × $7x^4$ = 105 $x^{1+2+4}$
V = $105x^7$ cubic units

**5.** The area of a rectangle that has length = $2a^2b$ and breadth = $3ab^2$ is:
(a) $6a^3b^3$ (b) $a^3b^3$ (c) $2a^3b^3$ (d) $4a^3b^3$
Ans: (a) $6a^3b^3$
Area of rectangle = $(2a^2b)(3ab^2) = 6a^3b^3$

## SECTION – B (2 marks)

**6.** Add the following polynomials:
$2x^2y^2 – 3xy + 4$, $5 + 7xy – 3x^2y^2$, and $4x^2y^2 + 10xy$
Ans: $2x^2y^2 – 3xy + 4$, $5 + 7xy – 3x^2y^2$, and $4x^2y^2 + 10xy$
$= (2x^2y^2 – 3xy + 4) + (5 + 7xy – 3x^2y^2) + (4x^2y^2 + 10xy)$
$= 2x^2y^2 – 3xy + 4 + 5 + 7xy – 3x^2y^2 + 4x^2y^2 + 10xy$
Add similar elements and rearrange.
$= 3x^2y^2 + 14xy + 9$

**7.** Find the value of $(x – y)(x + y) + (y – z)(y + z) + (z – x)(z + x)$
Ans: $(x – y)(x + y) + (y – z)(y + z) + (z – x)(z + x)$
$= x^2 – y^2 + y^2 – z^2 + z^2 – x^2$ [By algebraic identity: $a^2 – b^2 = (a+b)(a-b)$]
$= 0$

**8.** Using suitable algebraic identity, find the value of $1092^2$
Ans: Use the algebraic identity: $(a + b)^2 = a^2 + 2ab + b^2$
Now, $1092 = 1000 + 92$
So, $1092^2 = (1000 + 92)^2$
$(1000 + 92)^2 = (1000)^2 + 2 \times 1000 \times 92 + (92)^2$
$= 1000000 + 184000 + 8464$
Thus, $1092^2 = 1192464$.

**9.** Simplify: $2x^2(x + 2) – 3x(x^2 – 3) – 5x(x + 5)$
Ans: $2x^2(x + 2) – 3x(x^2 – 3) – 5x(x + 5)$
$= 2x^3 + 4x^2 – 3x^3 + 9x – 5x^2 – 25x$
$= 2x^3 – 3x^3 – 5x^2 + 4x^2 + 9x – 25x$
$= -x^3 – x^2 – 16x$

**10.** Simplify: $x^2(x – 3y^2) – xy(y^2 – 2xy) – x(y^3 – 5x^2)$
Ans: $x^2(x – 3y^2) – xy(y^2 – 2xy) – x(y^3 – 5x^2)$
$= x^3 – 3x^2y^2 – xy^3 + 2x^2y^2 – xy^3 + 5x^3$
Now, add the similar terms and rearrange.
$= x^3 + 5x^3 – 3x^2y^2 + 2x^2y^2 – xy^3 – xy^3$
$= 6x^3 – x^2y^2 – 2xy^3$

## SECTION – C (3 marks)

**11.** Simplify $7x^2(3x – 9) + 3$ and find its values for $x = 4$ and $x = 6$
Ans: $7x^2(3x – 9) + 3$
Solve for $7x^2(3x – 9)$
$= (7x^2 \times 3x) – (7x^2 \times 9)$ (using distributive law: $a(b – c) = ab – ac$)
$= 21x^3 – 63x^2$
So, $7x^2(3x – 9) + 3 = 21x^3 – 63x^2 + 3$

Now, for x = 4,
$21x^3 - 63x^2 + 3 = 21 \times 4^3 - 63 \times 4^2 + 3 = 1344 - 1008 + 3 = 336 + 3 = 339$
Now, for x = 6,
$21x^3 - 63x^2 = 21 \times 6^3 - 63 \times 6^2 + 3 = 2268 + 3 = 2271$

**12.** Solve the below using correct identities.
(a) $181^2 - 19^2$ (b) $497 \times 505$ (c) $2.07 \times 1.93$
Ans: (a) As $a^2 - b^2 = (a - b)(a + b)$
$181^2 - 19^2 = (181 - 19)(181 + 19)$
$= 162 \times 200 = 32400$
(b) By using the identity $(x + a)(x + b) = x2 + (a + b)x + ab$
$497 \times 505 = (500 - 3)(500 + 5)$
$= 500^2 + (-3 + 5) \times 500 + (-3)(5)$
$= 250000 + 1000 - 15 = 250985$
(c) As $(a + b)(a - b) = a^2 - b^2$
$2.07 \times 1.93 = (2 + 0.07)(2 - 0.07)$
$= 2^2 - 0.07^2 = 3.9951$

**13.** Using identities, evaluate.
(a) $5.2^2$ (b) 78 x 82 (c) 10.5 x 9.5
Ans:
(a) $5.2^2 = (5 + 0.2)^2$ Identity applied $(a + b)^2 = a^2 + 2ab + b^2$
$= 5^2 + 2(5 \times 0.2) + 0.2^2$
$= 25 + 2 + 0.04 = 27.04$
(b) $78 \times 82 = (80 - 2)(80 + 2)$ Identity applied $(a + b)(a - b) = a^2 - b^2$
$= 80^2 - 2^2$
$= 6400 - 4 = 6396$
(c) $10.5 \times 9.5 = (10 + 0.5)(10 - 0.5)$ Identity applied $(a + b)(a - b) = a^2 - b^2$
$= 10^2 - 0.5^2$
$= 100 - 0.25 = 99.75$

**14.** Show that LHS = RHS for the below equations.
(a) $(3x + 7)^2 - 84x = (3x - 7)^2$
(b) $(9p - 5q)^2 + 180pq = (9p + 5q)^2$
Ans:
(a) LHS = $(3x + 7)^2 - 84x$
$= (3x)^2 + 2(3x \times 7) + 7^2 - 84x$
$= 9x^2 + 42x + 49 - 84x$
$= 9x^2 - 42x + 49$
RHS = $(3x - 7)^2$
$= (3x)^2 - 2(3x \times 7) + 7^2$
$= 9x^2 - 42x + 49$
Hence LHS = RHS
(b) LHS = $(9p - 5q)^2 + 180pq$
$= (9p)^2 - 2(9p \times 5q) + (5q)^2 + 180pq$
$= 81p^2 + 90pq + 25q^2$

RHS = $( 9p + 5q )^2$

$= (9p)^2 + 2 ( 9p \times 5q ) + (5q)^2$

$= 81p^2 + 90pq + 25q^2$

Hence LHS = RHS

**15.** Expand the following, using suitable identities.

(a) $( xy + yz )^2$ (b) $( x^2y - xy^2 )^2$ (c) $( 7x + 5 )^2$

Ans:

(a) $(xy + yz)^2$

$= (xy)^2 + 2 (xy \times yz ) + (yz)^2$

$= x^2y^2 + 2xy^2z + y^2z^2$

(b) $(x^2y - xy^2)^2$

$= (x^2y)^2 - 2 (x^2y \times xy^2) + (xy^2)^2$

$= x4y^2 - 2x^3y^3 + x^2y4$

(c) $(7x + 5)^2$

$= (7x)^2 + 2 (7x \times 5) + (5)^2$

$= 49x^2 + 70x + 25$