



# ST. LAWRENCE HIGH SCHOOL



A JESUIT CHRISTIAN MINORITY INSTITUTION

CLASS 8

SUBJECT :Algebra & Geometry

STUDY MATERIAL 2

Marks:15

Algebraic Expression & Identities

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## ALGEBRAIC EXPRESSIONS AND IDENTITIES

### Synopsis

#### ◆ Algebraic expression:

A combination of constants and variables connected by +, -,  $\times$  and  $\div$  is known as an algebraic expression.

e.g.,  $2 - 3x + 5x^{-2}y^{-1} + \frac{x}{3y^3}$

#### ◆ Polynomial:

An algebraic expression in which the variables involved have only non-negative integral powers is called a polynomial.

e.g.,  $2 - 3x + 5x^2y - \frac{1}{3}xy^3$

#### ◆ Like terms: Terms formed from the same variables whose powers are same are called like terms. The coefficients of like terms need not be the same.

#### ◆ Unlike terms: Terms formed from different variables whose powers may be same or different are called unlike terms. The coefficients of unlike terms may or may not be the same.

In other words, terms with the same variables and which have the same exponent are called like or similar terms, otherwise they are called unlike (or) dissimilar terms.

e.g., (1)  $3x^3, \frac{1}{2}x^3, -9x^3, \dots$  etc, are like terms.

(2)  $x^2y, 3xy^2, -4x^3, \dots$ etc, are unlike terms.

#### ◆ Degree of a polynomial:

In case of a polynomial in one variable, the highest power of the variable is called the degree of the polynomial.

e.g.,  $5x^3 - 7x + \frac{3}{2}$  is a polynomial in 'x' of degree 3.

In case of polynomial in more than one variable, the sum of the powers of the variables in each term is taken up and the highest sum so obtained is called the degree of the polynomial.

**e.g.**,  $5x^3 - 2x^2y^2 - 3x^2y + 9y$  is a polynomial of degree 4 in 'x' and 'y'.

### Types of polynomials:

- (i) **Monomial:** A polynomial containing 1 term is called a monomial.
- (ii) **Binomial:** A polynomial containing 2 terms is called a binomial.
- (iii) **Trinomial:** A polynomial containing 3 terms is called a trinomial.

### Multiplication of polynomials:

- (i) A monomial multiplied by a monomial always gives a monomial.
- (ii) While multiplying a polynomial by a monomial, we multiply every term in the polynomial by the monomial.
- (iii) In carrying out the multiplication of a polynomial by a binomial (or trinomial), we multiply term by term, i.e., every term of the polynomial is multiplied by every term in the binomial (or trinomial). Note that in such multiplication, we may get terms in the product which are like and have to be combined.

### Identity:

An identity is an equality, which is true for all values of the variables in the equality.

### Some important identities:

- (i)  $(a + b)^2 = a^2 + 2ab + b^2$
- (ii)  $(a - b)^2 = a^2 - 2ab + b^2$
- (iii)  $(a + b)(a - b) = a^2 - b^2$
- (iv)  $(x + a)(x + b) = x^2 + (a + b)x + ab$
- (v) These identities are useful in computing squares and products of algebraic expressions. They are alternative methods to calculate products of numbers too.

## **QUESTION BANK**

## Multiple Choice Questions

A

B

C

D



- 1 Find the degree of the polynomial  $5x^3 - 6x^3y + 4y^2 - 8$ .  
 (A) 3 (B) 4 (C) 2 (D) 6
- 2 What must be added to  $x^3 + 3x - 8$  to get  $3x^3 + x^2 + 6$ ?  
 (A)  $2x^3 + x^2 - 3x + 14$   
 (B)  $2x^2 + x^2 + 14$   
 (C)  $2x^3 + x^2 - 6x - 14$   
 (D)  $-2x^3 - x^2 + 6x - 14$
- 3 What must be subtracted from  $x^3 - 3x^2 + 5x - 1$  to get  $2x^3 + x^2 - 4x + 2$ ?  
 (A)  $-x^3 + 4x^2 - 9x + 3$   
 (B)  $x^3 + 4x^2 - 9x + 3$   
 (C)  $x^3 - 4x^2 + 9x - 3$   
 (D)  $-x^3 - 4x^2 + 9x - 3$
- 4 What is the measure of the third side of a triangle given that its two sides are  $a^2 - 2a + 1$  and  $3a^2 - 5a + 3$  and has a perimeter  $6a^2 - 4a + 9$ ?  
 (A)  $2a^2 - 3a - 5$  (B)  $2a^2 + 3a - 5$   
 (C)  $2a^2 + 3a + 5$  (D)  $2a^2 - 3a + 5$
- 5 Two sides of a rectangle are  $(3p + 5q)$  units and  $(5p - 7q)$  units. What is its area in sq. units?  
 (A)  $15p^2 + 4pq - 35q^2$   
 (B)  $15p^2 - 4pq + 35q^2$   
 (C)  $15p^2 + 14pq + 35q^2$   
 (D)  $15p^2 - 4pq - 35q^2$
- 6 Find the product of  $(x^2 + 3x + 5)$  and  $(x^2 - 1)$ .  
 (A)  $x^4 + 3x^3 - 4x^2 - 3x - 5$   
 (B)  $x^4 + 3x^3 + 4x^2 - 3x - 5$   
 (C)  $x^4 + 3x^3 + 4x^2 + 3x - 5$   
 (D)  $x^4 - 3x^3 - 4x^2 + 3x - 5$
- 7 The length of a rod is  $4x + 5y - 3z$  cm and the length of another is  $6x - 3y + z$  cm. By how much is the second rod longer than the first?  
 (A)  $2x + 8y + 4z$  (B)  $2x - 8y - 4z$   
 (C)  $2x + 8y - 4z$  (D)  $2x - 8y + 4z$
- 8 The sum of two expressions is  $x^3 - x^2 + 3x - 2$ . If one of them is  $x^2 + 5x - 6$ , what is the other?  
 (A)  $x^3 - 2x^2 - 2x - 4$   
 (B)  $x^3 + 3x^2 - 2x + 4$   
 (C)  $x^3 - 2x^2 - 2x + 4$   
 (D)  $-x^3 - 2x^2 + 2x - 4$
- 9 The difference of  $x^4 + 2x^2 - 3x + 7$  and another polynomial is  $x^3 + x^2 + x - 1$ . What is the other polynomial?  
 (A)  $x^4 - x^3 + x^2 - 4x + 8$   
 (B)  $x^3 + x^2 - 4x + 8$   
 (C)  $x^4 - x^3 + x^2 + 4x - 8$   
 (D)  $x^4 - x^3 - x^2 + 4x - 8$
- 10 Find the side of a square field of area  $\frac{9}{16}x^2 + \frac{25}{36}y^2 - \frac{5}{4}xy$  sq. units.  
 (A)  $\left(\frac{3}{4}x + \frac{5}{6}y\right)$  units (B)  $\left(\frac{3}{5}x - \frac{5}{6}y\right)$  units  
 (C)  $\left(\frac{3}{5}x + \frac{5}{6}y\right)$  units (D)  $\left(\frac{3}{4}x - \frac{5}{6}y\right)$  units
- 11 If  $(3x - 4)(5x + 7) = 15x^2 - ax - 28$ , what is the value of 'a'?  
 (A) 1 (B) -1 (C) -2 (D) 2
- 12 What is the difference obtained when  $x^3 - xy^2 + 5x^2y - y^3$  is subtracted from  $-y^3 - 6x^2y - xy^2 + x^3$ ?  
 (A)  $2y^3 - 8x^2y + 3xy^2 - 2x^3$   
 (B)  $2x^3 - 2xy^2 - x^2y - 2y^3$   
 (C)  $-11x^2y$   
 (D)  $11x^2y$
- 13 Find the missing term in the following expression.  

$$\left(\frac{3x}{4} - \frac{4y}{3}\right)^2 = \frac{9x^2}{16} + \text{---} + \frac{16y^2}{9}$$
 (A)  $2xy$  (B)  $-2xy$  (C)  $12xy$  (D)  $-12xy$



- 14 What is the value of  $\frac{7.83 \times 7.83 - 1.17 \times 1.17}{6.66}$  ?  
 (A) 9 (B) 6.66 (C) 1.176 (D) -9
- 15 If  $x - \frac{1}{x} = \sqrt{6}$ , find the value of  $x^2 + \frac{1}{x^2}$ .  
 (A) 2 (B) 4 (C) 6 (D) 8
- 16 If  $x^2 + \frac{1}{x^2} = 79$ , what is the value of  $x + \frac{1}{x}$  ?  
 (A) 7 (B) 9 (C)  $\sqrt{79}$  (D) -9
- 17 If  $3x - 7y = 10$  and  $xy = -1$ , find the value of  $9x^2 + 49y^2$ .  
 (A) 58 (B) 142 (C) 104 (D) -104
- 18 Given that  $x - \frac{1}{x} = 5$ , find the value of  $x^2 + \frac{1}{x^2}$ .  
 (A) -27 (B) 23 (C) 27 (D) -23
- 19 Evaluate the expression  $81p^2 + 16q^2 - 72pq$  when  $p = \frac{2}{3}$  and  $q = \frac{3}{4}$ .  
 (A) -16 (B) 9 (C) -9 (D) 16
- 20 What is the product of  $(4x - 3y)$  and  $(16x^2 + 12xy + 9y^2)$  ?  
 (A)  $(4x - 3y)^3$   
 (B)  $(16x^2 + 12xy + 9y^2)^2$   
 (C)  $64x^3 - 27y^3$   
 (D)  $64x^3 + 27y^3$
- 21 Using the identity  $(a - b)^2 = a^2 - 2ab + b^2$ , find the value of  $96^2$ .  
 (A) 9642 (B) 9461 (C) 9426 (D) 9216
- 22 Using the identity  $a^2 - b^2 = (a + b)(a - b)$ , evaluate  $24.7 \times 25.3$ .  
 (A) 624.91 (B) 642.91  
 (C) 624.19 (D) 642.19
- 23 Given that  $pq = 6$  and  $p + q = 5$ , find the value of  $p^2 + q^2$ .  
 (A) 300 (B) 37 (C) 13 (D) 12
- 24 The side of a square is 17 cm and the side of another is 983 cm. What is the difference of their areas in sq. cm ?  
 (A) 900660 (B) 966000  
 (C) 960600 (D) 906600
- 25 What is the value of  $\frac{(67.542)^2 - (32.458)^2}{75.458 - 40.374}$  ?  
 (A) 1 (B) 10 (C) 100 (D) 1000
- 26 A room is of dimensions  $6x$  feet in length and  $4y$  feet in breadth. A table measuring  $2x$  feet in length and  $y$  feet in breadth is in a corner of the room. Find the area of the room not occupied by the table.  
 (A)  $22xy$  sq feet (B)  $24xy$  sq feet  
 (C)  $26xy$  sq feet (D)  $20xy$  sq feet
- 27 Simplify  $\frac{3(3x + 4)}{2} + \frac{5(x - 3)}{3} - \frac{3(2x - 5)}{4}$ .  
 (A)  $\frac{57x - 56}{12}$  (B)  $\frac{56x + 57}{12}$   
 (C)  $\frac{57x + 56}{12}$  (D)  $\frac{56x - 57}{12}$
- 28 If  $x + y = 6$  and  $3x - y = 4$  find the value of  $x - y$ .  
 (A) -1 (B) 0 (C) 2 (D) 4
- 29 If the product of two numbers is 10 and their sum is 7, what is the larger of the two numbers ?  
 (A) -2 (B) 2 (C) 5 (D) 4
- 30 Find the value of the product  $\left(3 + \frac{5}{x}\right)\left(9 - \frac{15}{x} + \frac{25}{x^2}\right)$  at  $x = 1$ .  
 (A) 150 (B) 148 (C) 152 (D) 146
- 31 The volume  $V$ , of a solid is given by the formula  $V = \pi(R^2 - r^2)h$ . Find the value of  $V$ , given that  $R = 8$ ,  $r = 5$ ,  $h = 3\frac{1}{2}$  and  $\pi = \frac{22}{7}$ .  
 (A) 393 (B) 429 (C) 492 (D) 294
- 32 The area  $A$ , of a solid is given by the formula  $A = \pi r^2 + 2\pi rh + \pi rl$ . Find the value of  $A$  given that  $\pi = 3.142$ ,  $r = 10$ ,  $h = 3$  and  $l = 4$ .  
 (A) 629 (B) 628.4 (C) 630 (D) 631

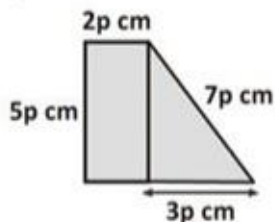
- 33 Mother bought some vegetables for ₹  $x$  and some fruits for ₹ 3. If she gave ₹ 10, to the shopkeeper, how much change did she receive ?

(A) ₹  $(13 - x)$  (B) ₹  $(7 + x)$   
(C) ₹  $(13 + x)$  (D) ₹  $(7 - x)$

- 34 Ajit is 21 years younger than his father. What is their total age in 7 years time ?

(A)  $(x + 28)$  years (B)  $(x + 35)$  years  
(C)  $(2x + 28)$  years (D)  $(2x + 35)$  years

- 35 If the perimeter of the figure given is 57 cm, find the perimeter of the triangle in the figure.



(A) 30 cm (B) 45 cm (C) 39 cm (D) 3 cm



### Previous Contest Questions

- 1 A concert hall with 1000 seats is completely filled with ' $x$ ' boys, ' $y$ ' girls and adults. Admission fee for an adult is ₹ 10 while a

child pays  $\frac{1}{2}$  the price. Find in terms of ' $x$ ' and ' $y$ ', the total amount collected.

(A) ₹  $2(3000 + x + y)$   
(B) ₹  $(6000 - x - y)$   
(C) ₹  $(2000 - x - y)$   
(D) ₹  $5(2000 - x - y)$

- 2 A steel rod is cut into 3 pieces. The second piece is twice as long as the first piece while the third piece is 20 cm longer than the second piece. If the shortest piece is  $2x$  cm, find the length of the rod in metres.

(A)  $(x - 5)$  m (B)  $(x + 5)$  m  
(C)  $\left(\frac{x+2}{10}\right)$  m (D)  $\left(x + \frac{1}{5}\right)$  m

- 3 Given that  $T = \frac{2\pi l}{\sqrt{l^2 + g^2}}$ , find the value of  $T$  if  $\pi = 3.142$ ,  $l = 7.89$  and  $g = 9.81$ . (Give your answer correct to 3 significant figures.)

(A) 3.94 (B) 394 (C) 39.4 (D) 4.39

- 4 If  $2a - \frac{1}{2a} = 3$ , evaluate  $16a^4 + \frac{1}{16a^4}$ .

(A) 123 (B) 119 (C) 117 (D) 121

- 5 A set of school uniform consists of a shirt and a pair of trousers for boys and a blouse and a skirt for girls. A shirt costs ₹  $x$  and a pair of trousers costs ₹ 5 more. A blouse costs ₹  $y$  and a skirt costs ₹ 3 more. A class has 40 pupils of which 25 are boys. Each pupil orders 2 sets of uniform. Find (in simplest form) in terms of  $x$  and  $y$ , the total amount in rupees paid by the pupils.

(A)  $5x - 3y + 17$  (B)  $5x + 3y + 17$   
(C)  $5x + 3y - 17$  (D)  $5x - 3y - 17$

- 6 If  $\frac{17-3x}{5} - \frac{4x+2}{3} = 5 - 6x + \frac{7x+14}{3}$ , find the value of ' $x$ '.

(A) 2 (B) 4 (C) -4 (D) -2

- 7 Mohan has ₹  $P$ . Naveen has 4 times as much money as Mohan. Also Naveen has ₹ 15 more than Mohan. How much money do they have altogether ?

(A) ₹ 20 (B) ₹ 5 (C) ₹ 15 (D) ₹ 25

- 8 If Sudhir will be ' $x$ ' years old in 3 years, how old was he 5 years ago ?

(A)  $(x + 3)$  years (B)  $(x - 8)$  years  
(C)  $(x - 5)$  years (D)  $(x - 3)$  years

- 9 60 equally priced downloads cost ₹  $x$ . How much do 9 downloads cost ?

(A) ₹  $\frac{20}{3x}$  (B) ₹  $\frac{9x}{20}$  (C) ₹  $\frac{20x}{3}$  (D) ₹  $\frac{3x}{20}$

- 10 If ' $n$ ' is a negative integer, which of the following must be a positive integer?

(A)  $n + 2$  (B)  $2n$   
(C)  $n^2 - 5$  (D)  $n^2 + 1$



# SOLUTIONS

## Multiple Choice Questions

1. (B) The highest power of the variables is  $3 + 1 = 4$ .

$$\begin{array}{r} 2x^3 + x^2 - 3x + 14 \\ + 3x^3 + x^2 + 0x + 6 \\ \hline 5x^3 + 2x^2 - 3x + 20 \end{array}$$

$$\begin{array}{r} x^3 - 3x^2 + 5x - 1 \\ + 2x^3 + x^2 - 4x + 2 \\ \hline 3x^3 - 2x^2 + x + 1 \end{array}$$

4. (C) 5. (A) 6. (B) 7. (D)

$$\begin{array}{r} x^3 - x^2 + 3x - 2 \\ (-) \quad x^2 + 5x - 6 \\ \hline x^3 - 2x^2 - 2x + 4 \end{array}$$

$$\begin{array}{r} x^4 + 0 + 2x^2 - 3x + 7 \\ (-) \quad x^3 + x^2 + x - 1 \\ \hline x^4 - x^3 + x^2 - 4x + 8 \end{array}$$

10. (D)

$$\begin{aligned} (3x - 4)(5x + 7) &= 15x^2 - ax - 28 \\ \Rightarrow 15x^2 + x - 28 &= 15x^2 - ax - 28 \end{aligned}$$

Comparing the coefficients of like terms, we get  $a = -1$ .

$$\begin{array}{r} x^3 - 6x^2y - xy^2 - y^3 \\ (-) \quad x^3 + 5x^2y - xy^2 - y^3 \\ \hline -11x^2y \end{array}$$

13. (B) 14. (A) 15. (D) 16. (B) 17. (A)

$$\begin{aligned} 18. (C) \quad x - \frac{1}{x} = 5 &\Rightarrow \left(x - \frac{1}{x}\right)^2 = 5^2 \\ &\Rightarrow x^2 + \frac{1}{x^2} - 2 = 25 \Rightarrow x^2 + \frac{1}{x^2} = 27 \end{aligned}$$

$$\begin{aligned} 19. (B) \quad \text{Given } p &= \frac{2}{3} \text{ and } q = \frac{3}{4} \\ 81p^2 + 16q^2 - 72pq &= 81\left(\frac{2}{3}\right)^2 + 16\left(\frac{3}{4}\right)^2 - 72\left(\frac{2}{3}\right)\left(\frac{3}{4}\right) \\ &= 81 \times \frac{4}{9} + 16 \times \frac{9}{16} - \frac{72}{2} \\ &= 36 + 9 - 36 = 9 \end{aligned}$$

$$\begin{aligned} 20. (C) \quad (4x - 3y)(16x^2 + 12xy + 9y^2) &= (4x)(16x^2 + 12xy + 9y^2) \\ &\quad + (-3y)(16x^2 + 12xy + 9y^2) \\ &= 64x^3 + 48x^2y + 36xy^2 \\ &\quad - 48x^2y - 36xy^2 - 27y^3 \\ &= 64x^3 - 27y^3 \end{aligned}$$

$$\begin{aligned} 21. (D) \quad 96^2 &= (100 - 4)^2 \\ &= 100^2 - 2(100)(4) + (4)^2 = 9216 \end{aligned}$$

$$\begin{aligned} 22. (A) \quad 24.7 \times 25.3 &= (25 - 0.3)(25 + 0.3) \\ &= 25^2 - (0.3)^2 \\ &= 625 - 0.09 = 624.91 \end{aligned}$$

$$\begin{aligned} 23. (C) \quad p^2 + q^2 &= (p + q)^2 - 2pq \\ &= 5^2 - 2(6) = 25 - 12 = 13 \end{aligned}$$

$$\begin{aligned} 24. (B) \quad \text{Area of bigger square} &= 983^2 \text{ sq. cm} \\ \text{Area of smaller square} &= 17^2 \text{ sq. cm} \\ \text{The difference of their areas} &= 983^2 - 17^2 \text{ sq. cm} \\ &= (983 + 17)(983 - 17) \text{ sq. cm} \\ &= 966000 \text{ sq. cm} \end{aligned}$$

25. (C) 26. (A) 27. (B) 28. (A) 29. (C)

$$\begin{aligned}
 30. \quad (C) \quad & \text{At } x = 1, \left(3 + \frac{5}{x}\right) \left(9 - \frac{15}{x} + \frac{25}{x^2}\right) \\
 & = \left(3 + \frac{5}{1}\right) \left(9 - \frac{15}{1} + \frac{25}{1}\right) \\
 & = (3 + 5)(9 - 15 + 25) \\
 & = 8 \times 19 = 152
 \end{aligned}$$

$$\begin{aligned}
 31. \quad (B) \quad & V = \pi(R^2 - r^2)h \\
 & = \frac{22}{7}(8^2 - 5^2) \left(3\frac{1}{2}\right) \\
 & = \frac{22}{7}(64 - 25) \left(\frac{7}{2}\right) \\
 & = \frac{22}{7} \times 39 \times \frac{7}{2} \\
 & = 11 \times 39 = 429
 \end{aligned}$$

$$\begin{aligned}
 32. \quad (B) \quad & \text{When } \pi = 3.142, r = 10, h = 3 \text{ and} \\
 & l = 4, \\
 & A = 3.142(10)(10 + 2 \times 3 + 4) \\
 & = 31.42(20) = 628.4
 \end{aligned}$$

$$33. \quad (D) \quad 34. \quad (D) \quad 35. \quad (B)$$

### Previous Contest Questions

1. (D) 2. (C) 3. (A) 4. (B) 5. (B)  
 6. (B) Multiplying both sides by 15, (i.e.,)  
 L.C.M of 5 and 3, we get

$$\begin{aligned}
 & 3(17 - 3x) - 5(4x + 2) \\
 & = 15(5 - 6x) + 5(7x + 14) \\
 & \Rightarrow 51 - 9x - 20x - 10 \\
 & = 75 - 90x + 35x + 70 \\
 & \Rightarrow 41 - 29x = 145 - 55x \\
 & \Rightarrow -29x + 55x = 145 - 41 \\
 & \Rightarrow 26x = 104 \Rightarrow x = \frac{104}{26} \\
 & \Rightarrow x = 4
 \end{aligned}$$

7. (D) According to the problem, Mohan has ₹ P.  
 Naveen has ₹ 4P  
 Also amount Naveen has = ₹ (P + 15)  
 $\therefore 4P = P + 15$   
 $\Rightarrow 3P = 15 \Rightarrow P = 5$

$\therefore$  Amount with Mohan = ₹ 5

Amount with Naveen = ₹ 20

$\therefore$  Total amount = ₹ 25

8. (B) Age of Sudhir after 3 years is 'x' years.

$\Rightarrow$  His present age = (x - 3) years.

Therefore, Sudhir's age 5 years ago

= (x - 3 - 5) years

= (x - 8) years

9. (D) 10. (D)

## SELF ASSESSMENT EXERCISE

Questions 1 – 15 given in worksheet

### EVERYDAY MATHEMATICS

16. The perimeter of a triangular field is  $6p^2 - 4p + 9$  and two of its sides are  $p^2 - 2p + 1$  and  $3p^2 - 5p + 3$ . Find the third side of the field.
- (A)  $8p^2 + 11p - 7$   
(B)  $2p^2 + 3p + 5$   
(C)  $3p^2 + 5p - 4$   
(D)  $5p^2 - 5p + 9$
17. If  $(x - 5)$  notebooks cost ₹  $(x^2 - 13x + 40)$ , what is the cost of one notebook?
- (A)  $(x - 1)$                       (B)  $(x - 2)$   
(C)  $(x - 6)$                       (D)  $(x - 8)$
18. Ameesha and Prachi love gardening. They water their garden regularly. The length and breadth of Ameesha's kitchen garden are  $x$  m and  $y$  m respectively. The length of Prachi's kitchen garden is 5 m more than that of Ameesha's garden and the breadth of Prachi's garden is 3 m more than that of Ameesha's garden. Find the difference between the area of Ameesha's kitchen garden and Prachi's kitchen garden.
- (A)  $(5x + 8y + 10)m^2$   
(B)  $(3x + 5y - 15)m^2$   
(C)  $(3x + 5y + 15)m^2$   
(D)  $(xy + 3x + 5y + 15)m^2$
19. Amit want to buy a rectangular field whose area is  $(3a^2 + 5ab + 2b^2)$  sq. units. One of its sides is  $(a + b)$  units. Find the length of the fence around the field.
- (A)  $(10a + 20b)$  units  
(B)  $(4a + 3b)$  units  
(C)  $(2a + 2b)$  units  
(D)  $(8a + 6b)$  units
20. A T-shirt costs ₹  $(x^2 - xy - y^2)$  and a sweater costs ₹  $(2x^2 + 8xy - 2y^2)$  and a jeans cost ₹  $(x^2 - 3xy + 4y^2)$ . After buying these items Mohit paid ₹  $(2x + y)^2$  to the cashier. How much amount Mohit receive from the cashier?
- (A) ₹ 0                              (B) ₹  $2x$   
(C) ₹  $(x + y)$                       (D) ₹  $2y$



21. Which of the following options hold?

**Statement-I** : The value of the product  $(4a^2 + 3b)(4a^2 + 3b)$  at  $a = 1$  and  $b = 2$  is 100.

**Statement-II** : Value of

$$\frac{(997 + 496)^2 - (997 - 496)^2}{997 \times 496} \text{ is } 2.$$

- (A) Both Statement-I and Statement-II are true.  
 (B) Statement-I is true but Statement-II is false.  
 (C) Statement-I is false but Statement-II is true.  
 (D) Both Statement-I and Statement-II are false.

22. Match the following.

	<b>Column-I</b>	<b>Column-II</b>
P.	$(3x^2 - 4xy) \times (3x^2 - 3xy)$	(i) $12x^2 + 53xy + 55y^2$
Q.	$(x^2 + 4y) \times (9x^2 + 9y)$	(ii) $9x^2 + 2y^4 + 11xy^2$
R.	$(3x + 5y) \times (4x + 11y)$	(iii) $9x^4 - 21x^2y + 12x^2y^2$
S.	$(y^2 + x) \times (2y^2 + 9x)$	(iv) $9x^4 + 45x^2y + 36y^2$

- (A) P → (iii); Q → (iv); R → (i); S → (ii)  
 (B) P → (ii); Q → (i); R → (iv); S → (iii)  
 (C) P → (iv); Q → (iii); R → (i); S → (ii)  
 (D) P → (iii); Q → (ii); R → (iv); S → (i)

23. If  $x^2 + y^2 = 29$  and  $xy = 2$ , find the value of  
 (i)  $x + y$  (ii)  $x - y$  (iii)  $x^4 + y^4$

	<b>(i)</b>	<b>(ii)</b>	<b>(iii)</b>
(A)	$\pm\sqrt{35}$	$\pm 6$	849
(B)	$\pm\sqrt{23}$	$\pm 5$	833
(C)	$\pm\sqrt{33}$	$\pm 5$	833
(D)	$\pm\sqrt{29}$	$\pm 3$	849

24. Fill in the blanks.

- (i) The product of two monomials is always P.  
 (ii) An equation is true for Q values of the variable.  
 (iii) An identity is true for R values of the variable.  
 (iv) The numerical factor of a term is called S.

	<b>P</b>	<b>Q</b>	<b>R</b>	<b>S</b>
(A)	Binomial	all	certain	variable
(B)	Monomial	certain	all	coefficient
(C)	Binomial	certain	all	variable
(D)	Monomial	all	certain	coefficient

25. Simplify :  $\frac{a^2 - 13a + 30}{(a - 10)} = \frac{a^2 + 4a + 4}{a + 2}$

- (A)  $a^2 - 8a - 20 = 0$   
 (B)  $a^2 + 30a - 40 = 0$   
 (C)  $a^2 - 80a - 30 = 0$   
 (D)  $a^2 + 7a - 30 = 0$

16. (A) (B) (C) (D)

17. (A) (B) (C) (D)

18. (A) (B) (C) (D)

19. (A) (B) (C) (D)

20. (A) (B) (C) (D)

21. (A) (B) (C) (D)

22. (A) (B) (C) (D)

23. (A) (B) (C) (D)

24. (A) (B) (C) (D)

25. (A) (B) (C) (D)

**ANSWERS:** 16-B,17-D,18-C,19-D,20- A, 21-B, 22-A,23-C,24-B,25-A

**INDRANIL GHOSH**

