



# B.K. BIRLA CENTRE FOR EDUCATION

SARALA BIRLA GROUP OF SCHOOLS  
A CBSE DAY-CUM-BOYS' RESIDENTIAL SCHOOL

TERM-1 EXAMINATION, 2025-26  
MATHEMATICS (041) (QP)

Class: X  
Date: 08/09/25  
Adm No:

Time: 3 hrs  
Max Marks: 80  
Roll.No.

### General Instructions:

1. This Question Paper has 5 Sections A, B, C, D and E.
2. Section A has 20 MCQs carrying 1 mark each
3. Section B has 5 questions carrying 02 marks each.
4. Section C has 6 questions carrying 03 marks each.
5. Section D has 4 questions carrying 05 marks each.
6. Section E has 3 case-based integrated units of assessment (04 marks each) with sub-parts.
7. All Questions are compulsory. However, an internal choice in 2 Qs of 5 marks, 2 Qs of 3 marks and 2 Questions of 2 marks have been provided. An internal choice has been provided in the 2marks questions of Section E
8. Draw neat figures wherever required. Take  $\pi = 22/7$  wherever required if not stated.

### SECTION A

1. The graph of a quadratic polynomial  $p(x)$  passes through the points  $(-6,0)$ ,  $(0, -30)$ ,  $(4,-20)$  and  $(6, 0)$ . The zeroes of the polynomial are  
(a) -6,0 (b) 4,6 (C) -30,-20 (d) -6,6 1m
2. The value of  $k$  for which the system of equations  $3x-ky= 7$  and  $6x+ 10y =3$  is inconsistent, is  
(a) -10 (b) -5 (C) 5 (d) none of these 1m
3. The distance of the point  $(-3,4)$  from the x-axis is  
(a) 3 (b) -3 (C) 4 (d) 5 1m
4. If  $n$ th term of an A.P. is  $7n-4$  then the common difference of the A.P. is  
(a) 7 (b)  $7n$  (C) -4 (d) none of these 1m
5. The pair of equations  $2x + 3y = 5$  and  $4x + 6y = 15$  has  
(a) a unique solution (b) exactly two solutions (C) infinitely many solutions (d) no solutions 1m
6. If  $\tan\theta = 5/2$  then  $\frac{4 \sin\theta + \cos\theta}{4 \sin\theta - \cos\theta}$  is equal to  
(a) 11/9 (b) 3/2 (C) 9/11 (d) none of these 1m
7. If one root of the equation  $2x^2 + ax + 6 = 0$  is 2 the  $a$  is  
(a) 7 (b) -7 (C) 7/2 (d) -7/2 1m
8. A quadratic polynomial having zeroes  $-\sqrt{5}/2$  and  $\sqrt{5}/2$  is  
(a)  $x^2- 5\sqrt{2}x +1$  (b)  $8x^2-20$  (C)  $15x^2-6$  (d) None of these 1m
9. If  $\theta = 30^\circ$  then the value of  $3\tan\theta$  is  
(a) 1 (b)  $1/\sqrt{3}$  (C)  $3/\sqrt{3}$  (d) none of these 1m
10. What is the common difference of an A.P. where  $a_{18} - a_{14} = 32$ ?  
(a) 8 (b) -8 (C) 4 (d) -4 1m
11. If  $\sin \alpha = 1/2$  then  $\cot \alpha = ?$  1m

- (a)  $1/\sqrt{3}$                       (b)  $\sqrt{3}$                       (C)  $\sqrt{3}/2$                       (d) 1
12. If  $\cos \alpha = 3/5$  then  $\tan \alpha = ?$  1m  
 (a)  $4/3$                       (b)  $3/5$                       (C)  $3/4$                       (d) none of these
13. If the height of the vertical pole is equal to the length of its shadow on the ground, 1m  
 the angle of elevation of the sun is  
 (a)  $0^\circ$                       (b)  $30^\circ$                       (C)  $45^\circ$                       (d)  $60^\circ$
14. If the length of the shadow of a tower is  $\sqrt{3}$  times its height then the angle of 1m  
 elevation of the sun is  
 (a)  $0^\circ$                       (b)  $45^\circ$                       (C)  $30^\circ$                       (d)  $60^\circ$
15. The area of a sector of a circle with a radius of 6 cm if the angle of the sector is  $60^\circ$ . 1m  
 (a)  $142/7$                       (b)  $152/7$                       (c)  $132/7$                       (d) none of these
16. A point on the x-axis divides the line segment joining the points A (2, -3) and B (5, 1m  
 6) in the ratio 1:2.  
 (a) (4,0)                      (b)  $(7/2, 3/2)$                       (c) (3,0)                      (d) none of these
17. The mode and mean are given by 8 and 7, respectively. Then the median is: 1m  
 (a)  $2/23$                       (b)  $3/22$                       (c)  $22/3$                       (d) none of these
18. The class interval of a given observation is 20 to 25, then the class mark for this 1m  
 interval will be:  
 (a) 10                      (b) 15                      (c) 22.5                      (d) none of these
19. Assertion (A):- If the value of mode and mean is 7 and 8 respectively, then the value 1m  
 of median is 23.  
 Reason (R):-  $3\text{Median} = \text{mode} + 2\text{mean}$ .  
 (a) Both Assertion (A) and Reason (R) are the true and Reason (R) is a correct  
 explanation of Assertion (A).  
 (b) Both Assertion (A) and Reason (R) are true but Reason (R) is not a correct  
 explanation of Assertion (A).  
 (c) Assertion (A) is true and Reason (R) is false.  
 (d) Assertion (A) is false and Reason (R) is true.
20. Assertion (A):- The point (a,0) lies on the x-axis. 1m  
 Reason (R):- Any point which lies on the y-axis is of the form (0,a).  
 (a) Both Assertion (A) and Reason (R) are the true and Reason (R) is a correct  
 explanation of Assertion (A).  
 (b) Both Assertion (A) and Reason (R) are true but Reason (R) is not a correct  
 explanation of Assertion (A).  
 (c) Assertion (A) is true and Reason (R) is false.  
 (d) Assertion (A) is false and Reason (R) is true.

SECTION B

21. Prove that  $5 + 2\sqrt{5}$  is an irrational number. 2m

OR

Prove that  $2 \times 3 \times 11 + 11$  is a composite number .

22. Solve  $2x + 3y = 11$  and  $2x - 4y = -24$  and hence find the value of m for which  $y =$  2m  
 $mx+3$ .
23. Find the values of p for which the quadratic equation  $4x^2 + px + 3 = 0$  has equal 2m  
 roots.

- 24 A horse, a cow and a goat are tied, each by ropes of length 14m, at the corners A, B and C respectively, of a grassy triangular field ABC with sides of lengths 35m, 40m and 50 m. Find the area of grass field that can be grazed by them. 2m

OR

Find the area of the major segment (in terms of  $\pi$ ) of a circle of radius 5cm, formed by a chord subtending an angle of  $90^\circ$  at the centre.

- 25 The sum of the first n terms of an AP is given by 2m

$$S_n = 5n^2 + 3n$$

- (a) Find the first term and the common difference of the AP.  
(b) Find the 10th term of the AP.

SECTION C

- 26 Find the coordinates of the points of trisection of the line segment joining A (2, -2) and B (-7, 4). 3m

- 27 Solve the following pair of equations: 3m

$$49x + 51y = 499$$

$$51x + 49y = 501$$

OR

Solve the following pair of linear equations for x and y:

$$(bx)/a + (ay)/b = a^2 + b^2; x + y = 2ab$$

- 28 Find the number of all three-digit natural numbers which are divisible by 8. 3m

- 29 Prove that:

$$\frac{\sin \theta - 2 \sin^3 \theta}{2 \cos^3 \theta - \cos \theta} = \tan \theta$$

- 30 For the quadratic polynomial 3m

$$p(x) = 2x^2 - 5x + 3$$

- (a) Find the sum and product of its zeros.  
(b) Form a quadratic polynomial whose sum of zeros is 4 and product of zeros is 3.

OR

The sum of the zeros of a quadratic polynomial is  $3/2$  and their product is 2.

- (a) Find the polynomial.  
(b) Verify the relationship between coefficients and zeros.

- 31 Heights of students of class X are given in the following frequency distribution: 3m

Height (in cm)	Number of students
150-155	15
155-160	8
160-165	20
165-170	12
170-175	5

Find the modal height.

**SECTION D**

- 32 Is it possible to design a rectangular park of perimeter 80 m and area  $400 \text{ m}^2$ ? If so, find its length and breadth. 5m

OR

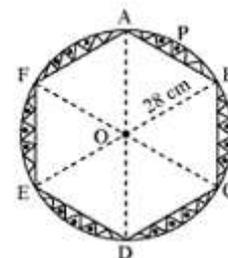
Solve the following quadratic equation for x:  $9x^2 - 6b^2x - (a^4 - b^4) = 0$

- 33 The angles of depression of two ships from the top of a lighthouse and on the same side of it are found to be  $45^\circ$  and  $30^\circ$ . If the ships are 200 m apart, find the height of the lighthouse. 5m

OR

Two poles of equal heights are standing opposite to each other on either side of the road, which is 100 m wide. From a point between them on the road, the angles of elevation of the top of the poles are  $60^\circ$  and  $30^\circ$  respectively. Find the height of the poles.

- 34 A round table cover has six equal designs as shown in Figure. If the radius of the cover is 28 cm, find the cost of making the designs at the rate of Rs. 0.35 per  $\text{cm}^2$ . (Use  $\sqrt{3} = 1.7$ )



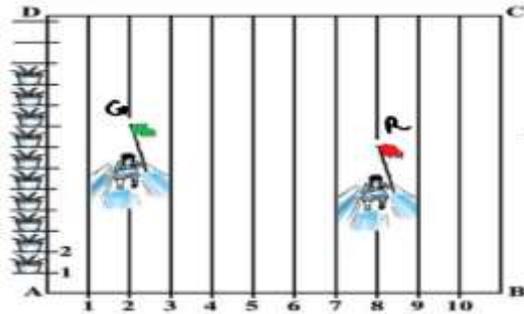
- 35 Find the values of x and y if the median for the following data is 31. 5m

Class	Frequency
0-10	5
10-20	x
20-30	6
30-40	y
40-50	6
50-60	5
<b>Total</b>	<b>40</b>

**SECTION E**

- 36 In order to conduct Sports Day activities in your School, lines have been drawn with chalk powder at a distance of 1 m each, in a rectangular shaped ground ABCD, 100 flowerpots have been placed at a distance of 1 m from each other along AD, as shown in given figure below. Niharika runs  $\frac{1}{4}$  th the distance AD on the 2nd line

and posts a green flag. Preet runs  $\frac{1}{5}$  th distance AD on the eighth line and posts a red flag.



- (i) Find the position (coordinates) of green flag.
- (ii) Find the position (coordinates) of red flag.
- (iii) Find the distance between green and red flag.

OR

What are the coordinates of mid-point of straight line joining green and red flag?

- 37 The owner of a taxi company decides to run all the taxis on CNG fuel instead of petrol/diesel. The taxi charges in the city are comprised of fixed charges together with the charge for the distance covered. For a journey of 12 km, the charge paid is Rs. 89; for a journey of 20 km, the charge is Rs.145. 4m
- (i) What are the equations formed for both conditions?
  - (ii) What will a person have to pay for travelling a distance of 30 km?
  - (iii) Why did he decide to use CNG for his taxi as fuel?

Or

If a customer sits in the car and get down immediately without travelling, how much he needs to pay?

- 38 A stadium has rows of seats in AP. The first row has 50 seats, the second row has 54 seats, the third row has 58 seats, and so on. 4m
- (a) Write the first term and common difference of the AP formed by the seats in each row.
  - (b) Find the number of seats in the 15th row.
  - (c) Find the total number of seats in the first 15 rows.

OR

If the total number of seats is 2070, find the number of rows in the stadium.

\*\*\*\*\* ALL THE BEST \*\*\*\*\*