

KENDRIYA VIDYALAYA SANGATHAN, RANCHI REGION
SECOND PRE-BOARD EXAM (2025-26)
CLASS-X
SUBJECT-MATHEMATICS (BASIC-241)

Time Allowed: 3 Hours

Maximum Marks: 80

General Instructions:

1. This Question Paper has 5 Sections A, B, C, D, and E.
2. Section A has 20 Multiple Choice Questions (MCQs) carrying 1 mark each.
3. Section B has 5 Short Answer-I (SA-I) type questions carrying 2 marks each.
4. Section C has 6 Short Answer-II (SA-II) type questions carrying 3 marks each.
5. Section D has 4 Long Answer (LA) type questions carrying 5 marks each.
6. Section E has 3 Case Based integrated units of assessment (4 marks each) with sub-parts of the values of 1, 1 and 2 marks each respectively.
7. All Questions are compulsory. However, an internal choice in 2 Qs of 2 marks, 2 Qs of 3 marks and 2 Questions of 5 marks has been provided. An internal choice has been provided in the 2 marks questions of Section E.
8. Draw neat figures wherever required. Take $\pi = 22/7$ wherever required if not stated.

Section A

Section A consists of 20 questions of 1 mark each.

Q. No.	Questions	Marks
1	If p and q are two co-prime numbers, then HCF of p and q is (a) 1, (b) pq (c) 0 (d) 2p	1
2	If product of two numbers is 369 and their LCM is 369, then their HCF = ____ (a) 2 (b) 7 (c) 1 (d) 369	1
3	If one zero of the quadratic polynomial $x^2 + 4x - k$ is 3, then the value of k is (a) 10 (b) 21 (c) 5 (d) -5	1
4	The pair of linear equations $3x+3y = 5$ and $4x+6y = 10$ has (a) unique solution (b) infinite solution (c) No solution (d) None of these	1
5	A circle can have ____ parallel tangents at a single time. (a) One (b) Two (c) Three (d) Four	1

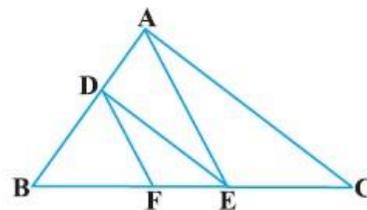
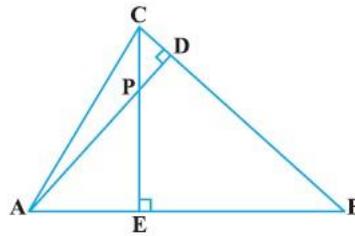
6	The perimeter of a triangle with vertices (0, 4), (0, 0) and (3, 0) is (a) 5 units (b) 12 units (c) 11 units (d) $(7 + \sqrt{5})$ units	1												
7	If in triangles ABC and DEF, $\frac{AB}{DE} = \frac{BC}{FD}$, then they will be similar, when (a) $\angle B = \angle E$ (b) $\angle A = \angle D$ (c) $\angle B = \angle D$ (d) $\angle A = \angle F$	1												
8	Find the 5 th term of the given A. P. 2,5,8,..... (a) 14 (b) 51 (c) 16 (d) 12	1												
9	In the figure, if PA and PB are tangents to the circle with centre O such that $\angle APB = 50^\circ$, then $\angle OAB$ is equal to (a) 25° (b) 30° (c) 40° (d) 50°	1												
10	. If $\sin A = 1/2$, then the value of $\cos A$ is : (a) $\sqrt{3}/2$ (b) $1/\sqrt{3}$ (c) $\sqrt{3}$ (d) 1	1												
11	$\sqrt{4 \cos^2 A + 4 \sin^2 A}$ is equal to (a) 1 (b) $\frac{1}{\sqrt{3}}$ (c) 2 (d) 0	1												
12	The value of $\sqrt{(1+\sin A)(1-\sin A)}$ is (a) $\sec A$ (b) $\sin A$ (c) $\operatorname{cosec} A$ (d) $\cos A$	1												
13	If a cone is cut parallel to the base of it by a plane in two parts, then the shape of the top of the cone will be a: (a) Sphere (b) Cube (c) Cone itself (d) Cylinder	1												
14	If the radii of two circles are in the ratio of 2 : 3, then their areas are in the ratio of : (a) 4 : 6 (b) 8 : 3 (c) 4 : 9 (d) 9 : 16	1												
15	The total surface area of a solid hemisphere of radius 7 cm is : (a) $447\pi \text{ cm}^2$ (b) $239\pi \text{ cm}^2$ (c) $174\pi \text{ cm}^2$ (d) $147\pi \text{ cm}^2$	1												
16	For the following distribution: <table border="1" style="margin-left: auto; margin-right: auto;"> <tbody> <tr> <td>Class</td> <td>0 - 5</td> <td>5 - 10</td> <td>10 - 15</td> <td>15 - 20</td> <td>20 - 25</td> </tr> <tr> <td>Frequency</td> <td>10</td> <td>15</td> <td>12</td> <td>20</td> <td>9</td> </tr> </tbody> </table> <p>the lower limit of the modal class is (a) 10 (b) 15 (c) 20 (d) 25</p>	Class	0 - 5	5 - 10	10 - 15	15 - 20	20 - 25	Frequency	10	15	12	20	9	1
Class	0 - 5	5 - 10	10 - 15	15 - 20	20 - 25									
Frequency	10	15	12	20	9									
17	If the mean of the following distribution is 2.6, then the value of y is	1												

	<table border="1"> <tr> <td>Variable (x)</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> </tr> <tr> <td>Frequency</td> <td>4</td> <td>5</td> <td>y</td> <td>1</td> <td>2</td> </tr> </table>	Variable (x)	1	2	3	4	5	Frequency	4	5	y	1	2	
Variable (x)	1	2	3	4	5									
Frequency	4	5	y	1	2									
	(a) 3	(b) 8	(c) 13	(d) 24										
18	A card is selected at random from a well shuffled deck of 52 cards. The probability of its being a face card is				1									
	(a) $\frac{3}{26}$	(b) $\frac{3}{13}$	(c) $\frac{2}{13}$	(d) $\frac{1}{2}$										
19	<p>Direction for questions 19 & 20: In question numbers 19 and 20, a statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct option.</p> <p>Assertion: If HCF of 510 and 92 is 2, then the LCM of 510 & 92 is 32460</p> <p>Reason: as $HCF(a,b) \times LCM(a,b) = a \times b$</p> <p>(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).</p> <p>(b) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).</p> <p>(c) Assertion (A) is true but Reason (R) is false.</p> <p>(d) Assertion (A) is false but Reason (R) is true.</p>				1									
20	<p>Assertion (A): The distance of the point (2, 11) from the x -axis is 11 units.</p> <p>Reason (R): The distance of the point (x, y) from the x -axis is it's ordinate, i.e.,y-units.</p> <p>(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).</p> <p>(b) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).</p> <p>(c) Assertion (A) is true but Reason (R) is false.</p> <p>(d) Assertion (A) is false but Reason (R) is true.</p>				1									

Section B

Section B consists of 5 questions of 2 marks each.

21	For what values of k will the following pair of lines $5x + 7y = 3$ and $15x + 21y = k$ will be coincided ?	2
22	<p>In the figure, altitudes AD and CE of $\triangle ABC$ intersect each other at the point P.</p> <p>Show that:</p> <p>(i) $\triangle ABD \sim \triangle CBE$ (ii) $\triangle PDC \sim \triangle BEC$</p> <p style="text-align: center;">[OR]</p> <p>In the figure, $DE \parallel AC$ and $DF \parallel AE$. Prove that $\frac{BF}{FE} = \frac{BE}{EC}$</p>	2
23	Prove that the tangents drawn at the ends of a diameter of a circle are parallel.	2
24	Given $15 \cot A = 8$, find $\sin A$ and $\sec A$.	2
25	<p>Find the perimeter of a quadrant of a circle of radius 7 cm.</p> <p style="text-align: center;">[OR]</p> <p>Find the diameter of a circle whose area is equal to the sum of the areas of the two circles of radii 24 cm and 7 cm.</p>	2



Section C

Section C consists of 6 questions of 3 marks each.

26	Prove that $\sqrt{5}$ is an irrational number.	3
27	Find the zeroes of the quadratic polynomial $3x^2 - x - 4$ and verify the relationship between the zeroes and the coefficients.	3
28	A shopkeeper gives books on rent for reading. She takes a fixed charge for the first two days, and an additional charge for each day thereafter. Latika paid Rs 22 for a book kept for six days, while Anand paid Rs 16 for the book kept for four days. Find the fixed charges and the charge for each extra day.	3

	[OR] A fraction becomes $\frac{9}{11}$ if 2 is added to both the numerator and the denominator. If 3 is added to both the numerator and the denominator, it becomes $\frac{5}{6}$. Find the fraction.	
29	Prove that the length of the tangents drawn from an external point to a circle are equal.	3
30	If $\sin(A-B) = \frac{1}{2}$, and $\cos(A+B) = \frac{1}{2}$, Find A and B. $0^\circ < A + B \leq 90^\circ, A > B$, [OR] If $\sin \theta + \cos \theta = \sqrt{3}$, then prove that $\tan \theta + \cot \theta = 1$	3
31	A coin is tossed two times. Find the probability of getting (i) at most one head (ii) no head.	3

Section D

Section D consists of 4 questions of 5 marks each.

32	A train covers a distance of 90 km at a uniform speed. Had the speed been 15 km/hr more, it would have taken 30 minutes less for the journey. Find the original speed of the train. [OR] The sum of a two-digit number and the number obtained by reversing the digits is 66. If the digits of the number differ by 2, find the number. How many such numbers are there?	5
33	State and Prove Basic proportionality Theorem (BPT)	5
34	A tent is in the shape of a right circular cylinder surmounted by a cone. The total height and the diameter of the base are 13.5m and 28m, respectively. If the height of the cylindrical portion is 3m, find the total surface area of the tent. [OR] A toy is in the shape of a right circular cone surmounted by a hemisphere. The radius of the hemisphere and cone is 5 cm. Find the surface area of the toy if the total height of the toy is 17 cm..	5

35 The following table shows the ages of the patients admitted in a hospital during a year. 5

Age (in years)	No. of patients
5 – 15	6
15 – 25	11
25 – 35	21
35 – 45	23
45 – 55	14
55 – 65	5

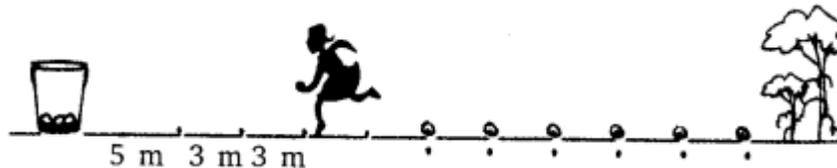
Find the mode and the mean of the data given above

Section E

Case study-based questions are compulsory.

36 **Case Study – 1** 4

In a potato race, a bucket is placed at the starting point, which is 5 m from the first potato, and the other potatoes are placed 3 m apart in a straight line. There are ten potatoes in the line.



A competitor starts from the bucket, picks up the nearest potato, runs back with it, drops it in the bucket, runs back to pick up the next potato, runs to the bucket to drop it in, and she continues in the same way until all the potatoes are in the bucket.

Based on the above information answer the following questions.

(I) Find the Series and check whether it is in AP?

1

(II) How much distance a competitor has to run to collect 3 potatoes?

1

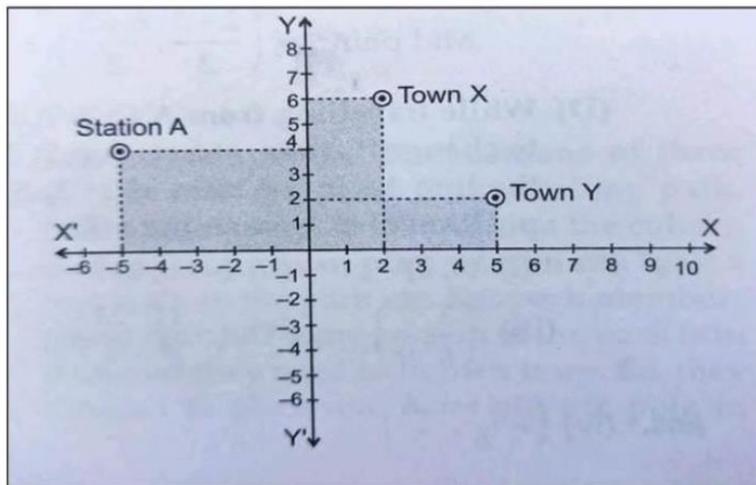
(III) What is the total distance the competitor has to run?

2

[OR]

In the series what will be the sum of 4th term and 8th term?

Two friends Dalvin and Alice work in the same office in Toronto. In the Christmas vacation, they both decided to go to their home towns represented by Town X and Town Y. Town X and Town Y are connected by trains from the same station A in Toronto. The situation of Town X, Town Y and station A is shown on the coordinate axis.



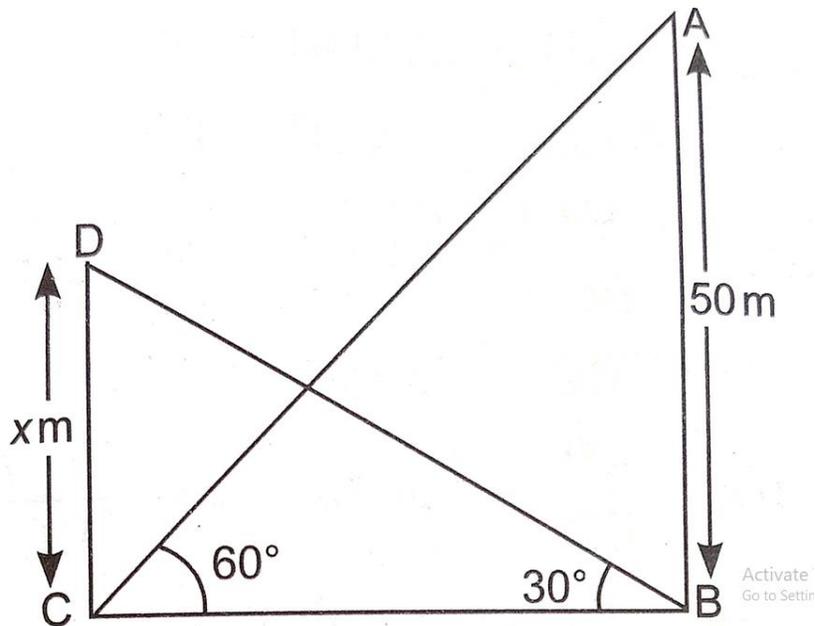
Based on the above information answer the following questions using the coordinate geometry.

- (I) What is the distance that Dalvin has to travel to reach his hometown X?
1
- (II) What is the distance that Alice has to travel to reach her hometown Y?
1
- (III) While travelling from A to Y, Alice had to change the train, at a station, it divides the line AY in the ratio of 2:3, find the coordinates of position of that station. 2

[OR]

In what ratio, Y - axis divides the line segment joining A and Y? Also find the coordinates of point of intersection.

The angle of elevation of the top of a building from the foot of a tower is 30° and the angle of elevation of the top of the tower from the foot of the building is 60° . The height of the tower is 50 m. Observe the given figure and give the answer of the following:



- (i) What is the distance between building CD and tower AB? 1
- (ii) What is the distance between root of building CD and the top of the tower AB? 1
- (iii) Find the height of building CD? 2

OR

Find the distance between root of tower AB and the top of the building CD?

END OF QUESTIONS