

KVS(DR)/2025-26/ SA

KENDRIYA VIDYALAYA SANGATHAN, DELHI REGION
PRE BOARD-2 (2025-26)

CLASS: X
MM:80

SUBJECT: MATHEMATICS STANDARD
Time:3:00 Hours

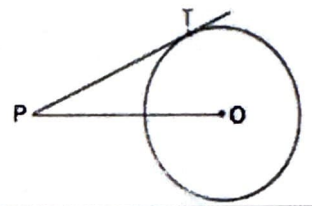
General Instructions:

1. This Question Paper has 5 Sections A, B, C, D and E.
2. Section A has 18 MCQs and 2 Assertion and reasoning Questions 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 of the values of 1, 1 and 2 marks each respectively.
7. All Questions are compulsory. However, an internal choice in 2 Questions of 5 marks, 2 Questions of 3 marks and 2 Questions of 2 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.

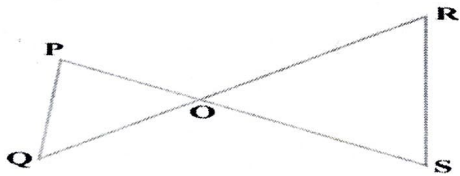
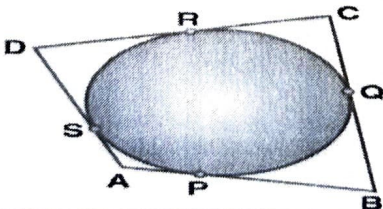
SECTION A

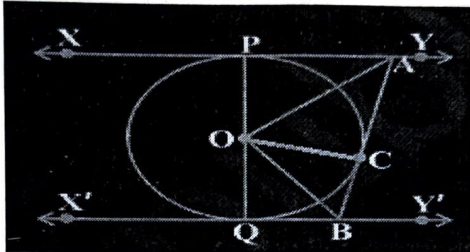
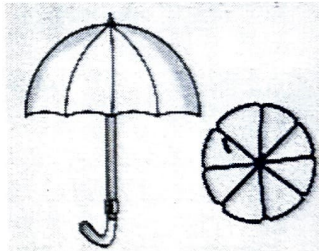
Q. No.	Section A consists of 20 questions of 1 mark each.	Marks
1	If the zeroes of the quadratic polynomial $x^2 + (a + 1)x + b$ are 2 and -3, then (a) $a = -7, b = -1$ (b) $a = 5, b = -1$ (c) $a = 2, b = -6$ (d) $a = 0, b = -6$	1
2	If $(x-2)^2 + 1 = 2x - 3$ is a quadratic equation, then find the value of discriminant (a) 4 (b) -3 (c) -6 (d) -4	1
3	For what value k, do the equations $2x - y + 3 = 0$ and $6x - ky + 9 = 0$ represent coincident lines? (a) 2 (b) -2 (c) 3 (d) -3	1
4	If the sum and product of the roots of the equation $3x^2 - 8x + 2k = 0$ are equal, then the value of k is (a) 4 (b) 3 (c) 6 (d) 8	1

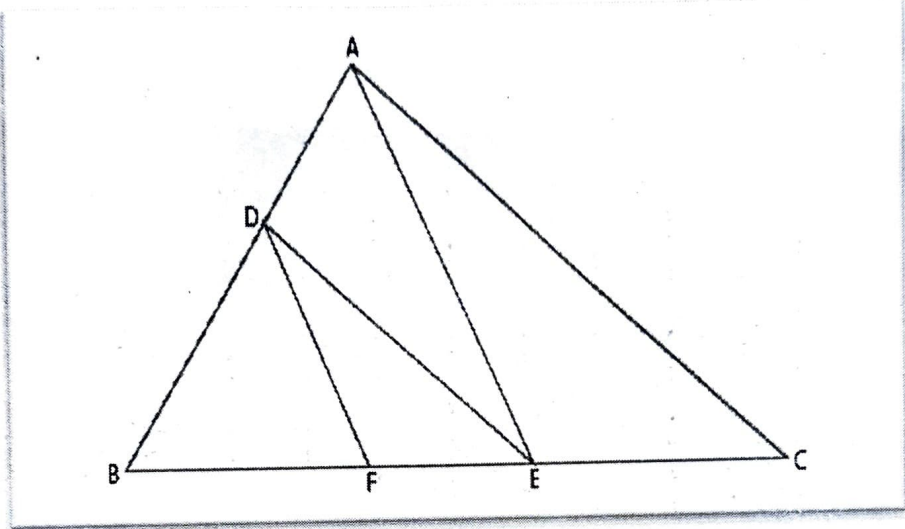
5	If $2x, x + 10, 3x + 2$ are in A.P., then x is equal to (a) 0 (b) 2 (c) 4 (d) 6	1
6	The coordinates of a point P, where PQ is the diameter of a circle whose centre is $(2, -3)$ and Q is $(1, 4)$ is: (a) $(3, -10)$ (b) $(2, -10)$ (c) $(-3, 10)$ (d) $(-2, 10)$.	1
7	If the distance between the points $A(2, -2)$ and $B(-1, x)$ is equal to 5, then the value of x is: (a) 2 (b) -2 (c) 1 (d) -1	1
8	The value of $(\sin 30^\circ + \cos 30^\circ) - (\sin 60^\circ + \cos 60^\circ)$ is (a) -1 (b) 0 (c) 1 (d) 2	1
9	If $3\sec \theta - 5 = 0$, then $\cot \theta$ is (a) $4/5$ (b) $5/3$ (c) $3/4$ (d) $3/5$	1
10	In the given figure, point P is 26 cm away from the centre O of a circle and the length PT of the tangent drawn from P to the circle is 24 cm. Then the radius of the circle is (a) 25 cm (b) 26 cm (c) 24 cm (d) 10 cm	1
11	If in two triangles ABC and PQR, $AB/QR = BC/PR = CA/PQ$, then (a) $\Delta PQR \sim \Delta CAB$ (b) $\Delta PQR \sim \Delta ABC$ (c) $\Delta CBA \sim \Delta PQR$ (d) $\Delta BCA \sim \Delta PQR$	1
12	If $\Delta ABC \sim \Delta EDF$ and ΔABC is not similar to ΔDEF then which of the following is not true (a) $BC.EF = AC.FD$ (b) $AB.ED = AC.DE$ (c) $BC.DE = AB.EF$ (d) $BC.DE = AB.FD$	1
13	The ratio of the total surface area to the curved surface area of a cylinder with base radius 80 cm and height 20 cm is (a) 1 : 2 (b) 2 : 1 (c) 3 : 1 (d) 5 : 1	1
14	Volume and total surface area of a solid hemisphere are numerically equal. What is the diameter of hemisphere? (a) 9 units (b) 6 units (c) 4.5 units (d) 18 units	1
15	If mean of $a, a+3, a+6, a+9$ and $a+12$ is 10, then a is equal to; (a) 1 (b) 2 (c) 3 (d) 4	1



16	<p>Consider the following frequency distribution of the heights of 60 students of a class:</p> <table><tr><th>Height (in cm)</th><th>150 – 155</th><th>155 – 160</th><th>160 – 165</th><th>165 – 170</th><th>170 – 175</th><th>175 – 180</th></tr><tr><th>Number of students</th><td>15</td><td>13</td><td>10</td><td>8</td><td>9</td><td>5</td></tr></table> <p>The sum of the lower limit of the modal class and upper limit of the median class is</p> <p>(a) 310 (b) 315 (c) 320 (d) 330</p>	Height (in cm)	150 – 155	155 – 160	160 – 165	165 – 170	170 – 175	175 – 180	Number of students	15	13	10	8	9	5	1
Height (in cm)	150 – 155	155 – 160	160 – 165	165 – 170	170 – 175	175 – 180										
Number of students	15	13	10	8	9	5										
17	<p>Cards are marked with numbers 1 to 50 are placed in the box and mixed thoroughly. One card is drawn at random from the box. What is the probability of getting a prime number?</p> <p>(a) 1 (b) $\frac{4}{10}$ (c) $\frac{1}{2}$ (d) $\frac{3}{10}$</p>	1														
18	<p>A school has five houses A, B, C, D and E. One class has 23 students, 4 from house A, 8 from house B, 5 from house C, 2 from house D and the rest from house E. A single student is selected at random to be the class monitor. The probability that the selected student is not from houses A, B and C is:</p> <p>(a) $\frac{4}{23}$ (b) $\frac{6}{23}$ (c) $\frac{8}{23}$ (d) $\frac{17}{23}$</p>	1														
19	<p>DIRECTION: In the question number (19) and (20), a statement of assertion (A) is followed by a statement of Reason (R).</p> <p>Choose the correct option</p> <p>Statement A (Assertion): The HCF of two numbers is 15 and their product is 2250. Then their LCM is 150.</p> <p>Statement R(Reason): If a, b are two positive integers, then $HCF \times LCM = a \times b$.</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 and 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>															

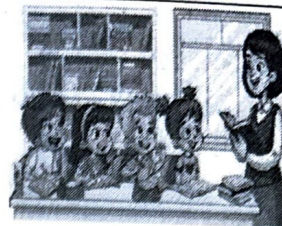
20	<p>Statement A (Assertion): If the perimeter of a circle is equal to that of a square, then the of their areas is 14:11</p> <p>Statement R (Reason): If the perimeter of a circle is equal to that of a square, then their areas are equal</p> <p>(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).</p> <p>(b) Both assertion (A) and reason (R) are true and 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		
21	Given that $\sqrt{3}$ is irrational, prove that $2 + 5\sqrt{3}$ is irrational.	2
22	One card is drawn from a well-shuffled deck of 52 cards. Calculate the probability that the card will be (i) an ace, (ii) not be an ace	2
23	<p>If $\sin(A+B) = 1$ and $\cos(A-B) = \frac{\sqrt{3}}{2}$ find A and B.</p> <p style="text-align: center;">OR</p> <p>If $\tan A = \sqrt{3}$ and $\tan B = \frac{1}{\sqrt{3}}$, $0 < A, B < 90^\circ$, then find the value of $\cot(A+B)$.</p>	2
24	<p>In the figure, if $PQR \parallel RS$, prove that $\triangle POQ \sim \triangle SOR$.</p> <div style="text-align: center;">  <p style="text-align: center;">OR</p> <p>Sides AB and BC and median AD of $\triangle ABC$ are respectively proportional to sides PQ and QR and median PM of $\triangle PQR$, show that $\triangle ABC \sim \triangle PQR$.</p> </div>	2
25	<p>A quadrilateral ABCD is drawn to circumscribe a circle as shown in the figure. Prove that $AB + CD = AD + BC$</p> <div style="text-align: center;">  </div>	2
SECTION C		
26	Prove that $\sqrt{5}$ is an irrational number.	3

27	If one of the zero of the polynomial $3x^2 + 8x + 2k + 1$ is seven times the other, find the value of 'k'.	3
28	Find the values of k for each of the following quadratic equations, so that they have two equal roots. (i) $2x^2 + kx + 3 = 0$ (ii) $kx(x - 2) + 6 = 0$ OR Find the roots of the equation $x^2 - 3x - m(m + 3) = 0$, where m is a constant.	3
29	Prove that $\frac{\tan \theta}{1 - \cot \theta} + \frac{\cot \theta}{1 - \tan \theta} = 1 + \sec \theta \cdot \operatorname{cosec} \theta$	3
30	XY and X'Y' are two parallel tangents to a circle with centre O and another tangent AB with the point of contact C intersecting XY at A and X'Y' at B. Prove that $\angle AOB = 90^\circ$. 	3
31	The length of the minute hand of a clock is 14 cm. Find the area swept by the minute hand in 5 minutes. (OR) An umbrella has 8 ribs which are equally spaced (see Fig.). Assuming umbrella to be a flat circle of radius 45 cm, find the area between the two consecutive ribs of the umbrella. 	3
SECTION D		
32	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 (OR) A train covered a certain distance at a uniform speed. If the train would have been 10km/h faster, it would have taken 2 hours less than the scheduled time. And, if the train were slower by 10km/h, it would have taken 3 hours more than the scheduled time. Find the distance covered by the train.	5

33	<p>Two poles of equal heights are standing opposite each other on either side of the road, which is 80 m wide. From a point between them on the road, the angles of elevation of the top of the poles are 60° and 30°, respectively. Find the height of the poles and the distances of the point from the poles.</p> <p style="text-align: center;">OR</p> <p>The tops of two tower of height x and y standing on level ground, subtends angle of 30° and 60° respectively at the centre of the line joining their feet, then find $x:y$.</p>	5														
34	<p>(i) State and prove BPT. (ii) In the figure, $DE \parallel AC$ and $DF \parallel AE$. Prove that $BF/FE = BE/EC$.</p> <div></div>	5														
35	<p>The mean of the following frequency table is 53. But the frequencies f_1 and f_2 in the classes 20–40 and 60–80 are missing. Find the missing frequencies</p> <table><tr><th>Age (in years)</th><th>0-20</th><th>20-40</th><th>40-60</th><th>60-80</th><th>80-100</th><th>Total</th></tr><tr><td>No. of people</td><td>15</td><td>f_1</td><td>21</td><td>f_2</td><td>17</td><td>100</td></tr></table>	Age (in years)	0-20	20-40	40-60	60-80	80-100	Total	No. of people	15	f_1	21	f_2	17	100	5
Age (in years)	0-20	20-40	40-60	60-80	80-100	Total										
No. of people	15	f_1	21	f_2	17	100										
SECTION - E : CASE STUDY BASED QUESTIONS.																

36

In a class the teacher asks every student to write an example of AP. Two boys Aryan and Roshan writes their progressions as $-5, -2, 1, 4, \dots$ and $187, 184, 181, \dots$ respectively. Now the teacher asks the various students of the class the following questions on this progression. Help students to find the answers of the following.



- (i) Find the sum of common difference of the two progressions.
- (ii) Find the 34th term of the progression written by Roshan.
- (iii) Find the sum of first 10 terms of the progression written by Aryan.

(OR)

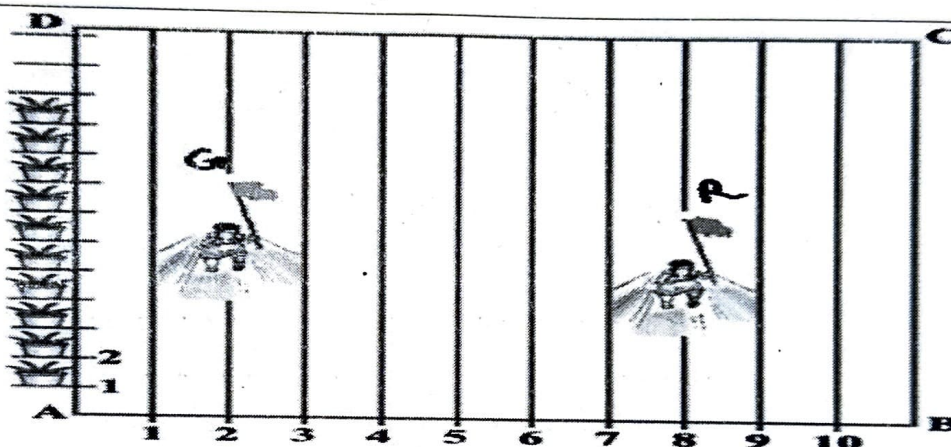
Which term of the two progressions will have the same value?

1

1

2

37



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.

1. Find the position of green flag
a) (2,25) (b) (2,0.25) (c) (25,2) (d) (0, -25)
2. Find the position of red flag
a) (8,0) (b) (20,8) (c) (8,20) (d) (8,0.2)
3. What is the distance between both the flags?
a) $\sqrt{41}$ (b) $\sqrt{11}$ (c) $\sqrt{61}$ (d) $\sqrt{51}$

OR

If Rashmi has to post a blue flag exactly halfway between the line segment joining the two flags, where should she post her flag?

- (a) (5, 22.5) (b) (10,22) (c) (2,8.5) (d) (2.5,20)

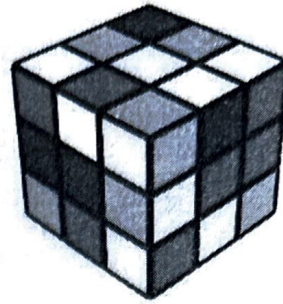
1

1

2

38

On a Sunday, your Parents took you to a fair. You could see lot of toys displayed, and you wanted them to buy a RUBIK's cube and strawberry ice-cream for you. Observe the figures and answer the questions:-



(i) Find the length of the diagonal if each edge measures 6cm ?

(ii) Find the volume of the solid figure if the length of the edge is 7cm?

(iii) What is the surface area of hemisphere (ice cream) if the base radius is 7cm?

(OR)

If the slant height of the conical part is 5 cm, and its radius is 4 cm, find its height.

1
1
2