

KENDRIYA VIDYALAYA GACHIBOWLI , GPRA CAMPUS HYD - 32
SAMPLE TEST PAPER 01 FOR CLASS X BOARD EXAM 2021

Max. marks: 80

Time Allowed: 3 hrs

General Instruction:

1. This question paper contains two parts A and B.

Part – A:

1. It consists three sections- I and II.
2. Section I has 16 questions of 1 mark each.
3. Section II has 4 questions on case study. Each case study has 5 case-based sub-parts. An examinee is to attempt any 4 out of 5 sub-parts.

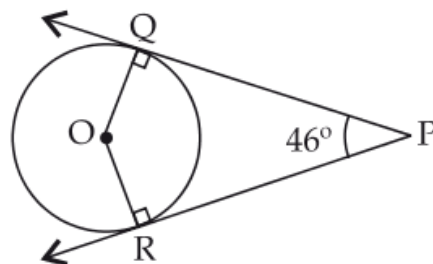
Part – B:

1. Question No 21 to 26 are Very short answer Type questions of 2 mark each,
2. Question No 27 to 33 are Short Answer Type questions of 3 marks each
3. Question No 34 to 36 are Long Answer Type questions of 5 marks each.

PART - A
SECTION-I

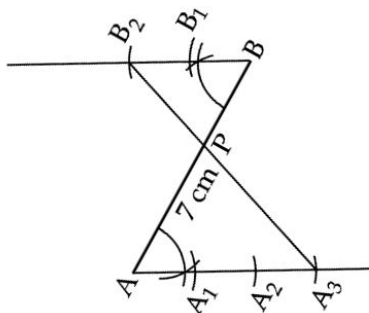
Questions 1 to 16 carry 1 mark each.

1. Write the smallest number which is divisible by both 306 and 657.
2. If zeroes of the polynomial $x^2 + 4x + 2a$ are α and $2/\alpha$, then find the value of a .
3. If the lines given by $3x + 2ky = 2$ and $2x + 5y + 1 = 0$ are parallel, then find the value of k .
4. Find 10th term from end of the AP: 4, 9, 14,, 254.
5. Find whether the lines represented by $2x + y = 3$ and $4x + 2y = 6$ are parallel, coincident or intersecting.
6. Find the positive root of $\sqrt{3x^2 + 6} = 9$.
7. Find the value of k for which the roots of the equation $3x^2 - 10x + k = 0$ are reciprocal of each other.
8. A chord of a circle of radius 10 cm subtends a right angle at its centre. Calculate the length of the chord (in cm).
9. In the given figure, PQ and PR are two tangents to a circle with centre O. If $\angle QPR = 46^\circ$, then calculate $\angle QOR$.



10. If $\triangle ABC \sim \triangle RPQ$, $AB = 3\text{cm}$, $BC = 5\text{cm}$, $AC = 6\text{cm}$, $RP = 6\text{cm}$ and $PQ = 10\text{cm}$, then find QR.

11. If $\operatorname{cosec} \theta = 5/4$, find the value of $\cot \theta$.
12. If $\theta = 45^\circ$, then find the value of $2\sec^2\theta + \operatorname{cosec}^2\theta$.
13. In the below figure, if B_1, B_2, \dots and A_1, A_2, A_3, \dots have been marked at equal distances. In what ratio P divides AB?



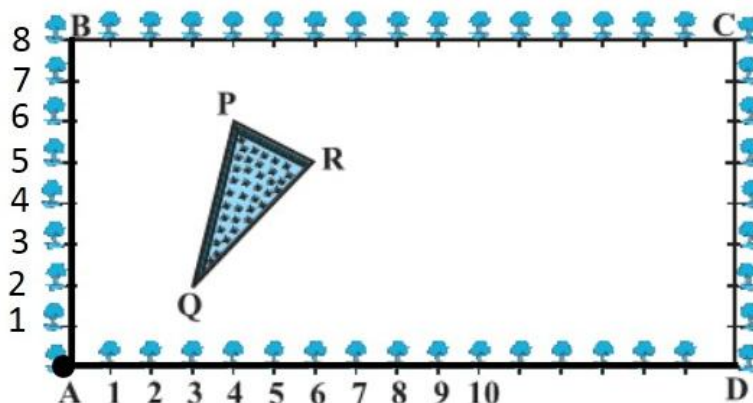
14. Volume and surface area of a solid hemisphere are numerically equal. What is the diameter of hemisphere?
15. The circumference of a circle is 22 cm. Find the area of its quadrant.
16. The probability of selecting a rotten apple randomly from a heap of 900 apples is 0.18. What is the number of rotten apple in the heap?

SECTION-II

Case study-based questions are compulsory. Attempt any four sub parts of each question. Each subpart carries 1 mark

17. Case Study based-1:

The Class X students of a secondary school in Krishinagar have been allotted a rectangular plot of land for their gardening activity. Sapling of Gulmohar are planted on the boundary at a distance of 1m from each other. There is a triangular grassy lawn in the plot as shown in the below figure. The students are to sow seeds of flowering plants on the remaining area of the plot.

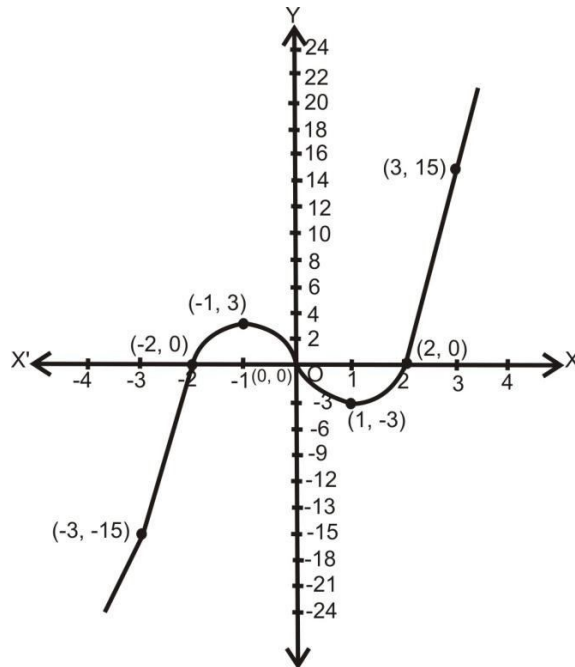


- (a) Taking A as origin, find the coordinates of the vertices of the triangle ΔPQR .
- (i) $P(4, 6), Q(3, 2), R(6, 5)$ (ii) $P(3, 2), Q(4, 6), R(6, 5)$
 (iii) $P(4, 6), Q(3, 2), R(5, 6)$ (iv) $P(4, 6), Q(2, 3), R(6, 5)$
- (b) What is the midpoint of side PQ, when A is the origin?
 (i) $(7/2, 9/2)$ (ii) $(7/2, 4)$ (iii) $(23/2, 9/2)$ (iv) none of these
- (c) What will be the coordinates of the vertices of a ΔPQR if C is the origin?
 (i) $P(10, 6), Q(13, 2), R(12, 5)$ (ii) $P(12, 2), Q(10, 6), R(13, 5)$
 (iii) $P(12, 6), Q(13, 2), R(10, 6)$ (iv) $P(12, 2), Q(13, 6), R(10, 3)$

- (d) What is the mid point of side QR, when C is the origin?
 (i) $(7/2, 9/2)$ (ii) $(7/2, 4)$ (iii) $(23/2, 9/2)$ (iv) none of these
- (e) The given problem is based on which mathematical concept
 (i) Coordinate Geometry (ii) triangles (iii) Similarity (iv) none of these

18. Case Study based-2: Bird-bath

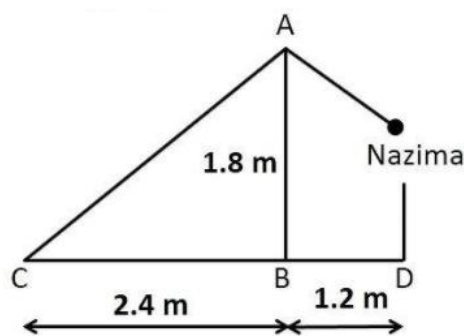
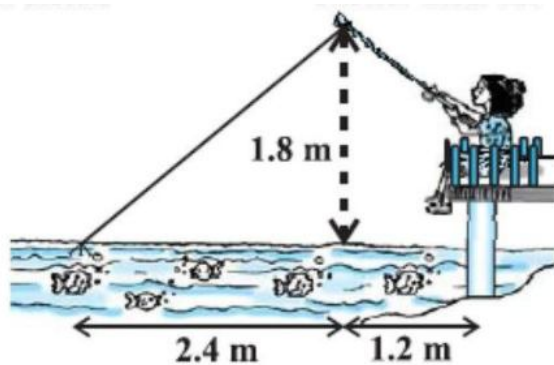
One day, due to heavy storm an electric wire got bent as shown in the figure. It followed some mathematical shape of curve. Answer the following questions below.



- (a) How many zeroes are there for the polynomial (shape of the wire)
 (i) 2 (ii) 3 (iii) 4 (iv) 5
- (b) Find the zeroes of the polynomial.
 (i) 2, 0, -2 (ii) 2, -2, -5 (iii) -2, 2, -5.5 (iv) None of these
- (c) Find the quadratic polynomial whose zeroes are -3 and 4.
 (i) $x^2 + 4x + 2$ (ii) $x^2 - x - 12$
 (iii) $x^2 - 7x - 12$ (iv) None of these
- (d) Name the type of expression of the polynomial?
 (i) quadratic (ii) cubic (iii) linear (iv) bi-quadratic
- (e) If one zero of the polynomial $x^2 - 5x - 6$ is 6 then find the other zero.
 (i) 1 (ii) -1 (iii) 2 (iv) -2

19. Case Study based-3:

Nazima is fly fishing in a stream. The tip of her fishing rod is 1.8 m above the surface of the water and the fly at the end of the string rests on the water 3.6 m away and 2.4 m from a point directly under the tip of the rod. She is pulling the string at the rate of 5 cm per second. Nazima's friend observe her position and draw a rough sketch by using A, B, C and D positions of tip, point directly under the tip of the rod, fish and Nazima's position (see the below figure). Assuming that her string (from the tip of her rod to the fly) is taut, answer the following questions:



- (a) What is the length AC?
 (i) 2 m (ii) 3 m (iii) 4 m (iv) 5 m
- (b) What is the length of string pulled in 12 seconds?
 (i) 6 m (ii) 0.3 m (iii) 0.6 m (iv) 3 m
- (c) What is the length of string after 12 seconds?
 (i) 2.4 m (ii) 2.7 m (iii) 2 m (iv) 2.2 m
- (d) What will be the horizontal distance of the fly from her after 12 seconds?
 (i) 2.7 m (ii) 2.78 m (iii) 2.58 m (iv) 2.2 m
- (e) The given problem is based on which concept?
 (i) Triangles (ii) Co-ordinate geometry (iii) Height and Distance (iv) None of these

20. Case Study based-4:

A group of students decided to make a project on Statistics. They are collecting the heights (in cm) of their 51 girls of Class X-A, B and C of their school. After collecting the data, they arranged the data in the following less than cumulative frequency distribution table form:

Height (in cm)	Number of girls
Less than 140	4
Less than 145	11
Less than 150	29
Less than 155	40
Less than 160	46
Less than 165	51

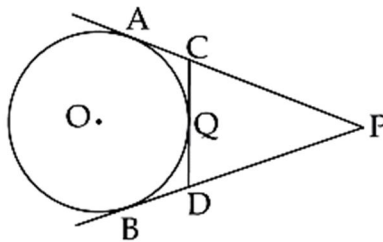


- (a) What is the lower limit of median class?
 (i) 145 (ii) 150 (iii) 155 (iv) 160
- (b) What is the upper limit of modal class?
 (i) 145 (ii) 150 (iii) 155 (iv) 160
- (c) What is the mean of lower limits of median and modal class?
 (i) 145 (ii) 150 (iii) 155 (iv) 160
- (d) What is the width of the class?
 (i) 10 (ii) 15 (iii) 5 (iv) none of these
- (e) The median is :
 (i) 149.03 cm (ii) 146.03 cm (iii) 147.03 cm (iv) 148.03 cm

PART – B

(Question No 21 to 26 are Very short answer Type questions of 2 mark each)

21. Given that $\sqrt{5}$ is irrational, prove that $2\sqrt{5} - 3$ is an irrational number.
22. How many natural numbers are there between 200 and 500, which are divisible by 7?
23. If $\sin\theta = 1/2$, then show that $3\cos\theta - 4\cos^3\theta = 0$.
24. Three vertices of a parallelogram taken in order are $(-1, 0)$, $(3, 1)$ and $(2, 2)$ respectively. Find the coordinates of fourth vertex.
25. Draw a pair of tangents to a circle of radius 3 cm which are inclined to each other at an angle of 60° .
26. In the given figure, PA and PB are tangents to the circle from an external point P. CD is another tangent touching the circle at Q. If $PA = 12\text{cm}$, $QC = QD = 3\text{cm}$, then find $PC + PD$.



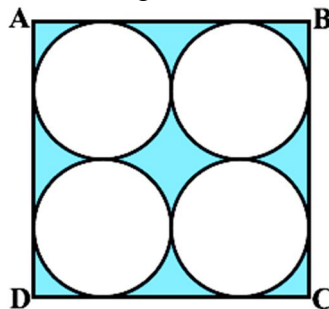
(Question no 27 to 33 are Short Answer Type questions of 3 marks each)

27. Find the greatest number of six digits exactly divisible by 18, 24 and 36.
28. If the roots of the quadratic equation $(a - b)x^2 + (b - c)x + (c - a) = 0$ are equal, prove that $2a = b + c$.

OR

Solve for x: $\frac{1}{(x-1)(x-2)} + \frac{1}{(x-2)(x-3)} = \frac{2}{3}, x \neq 1, 2, 3$

29. ABCD is a rhombus. Prove that $AB^2 + BC^2 + CD^2 + DA^2 = AC^2 + BD^2$.
30. Prove that: $\frac{\sin\theta - \cos\theta}{\sin\theta + \cos\theta} + \frac{\sin\theta + \cos\theta}{\sin\theta - \cos\theta} = \frac{2}{2\sin^2\theta - 1}$
31. Find the area of the shaded region in the fig., where ABCD is a square of side 28 cm.



32. The mean of the following frequency distribution is 62.8. Find the missing frequency x .

Class	0-20	20-40	40-60	60-80	80-100	100-120
Frequency	5	8	x	12	7	8

33. Cards numbered from 11 to 60 are kept in a box. If a card is drawn at random from the box, find the probability that the number on the drawn card is (i) an odd number (ii) a perfect square number (iii) divisible by 5.

(Question no 34 to 36 are Long Answer Type questions of 5 marks each.)

34. The area of a rectangle gets reduced by 9 square units, if its length is reduced by 5 units and breadth is increased by 3 units. If we increase the length by 3 units and the breadth by 2 units, the area increases by 67 square units. Find the dimensions of the rectangle.
35. The angle of elevation of a cloud from a point 60m above a lake is 30° and the angle of depression of the reflection of the cloud in the lake is 60° find the height of the cloud from the surface of the lake.
36. Due to heavy floods in a state, thousands were rendered homeless. 50 schools collectively offered to the state government to provide place and the canvas for 1500 tents to be fixed by the governments and decided to share the whole expenditure equally. The lower part of each tent is cylindrical of base radius 2.8 m and height 3.5 m, with conical upper part of same base radius but of height 2.1 m. If the canvas used to make the tents costs Rs. 120 per sq. m, find the amount shared by each school to set up the tents.

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