Sunali's Classes

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IX MATHS FULL COURSE PAPER – SET 2

Time: 3 Hours **Max. Marks: 80**

Instructions:

1. This question paper contains two parts A and B.
2. Both Part A and Part B have internal choices.

Part – A:

1. It consists two sections- Section I and Section II.
2. Section I has 16 questions of 1 mark each. Internal choice is provided in 5 questions
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 marks 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.
4. Internal choice is provided in 2 questions of 2 marks, 2 questions of 3 marks and 1 question of 5 marks.

Part – A
Section I

Directions (Q. Nos. 1-16) Section I has 16 questions of 1 mark each. Internal choice is provided in 5 questions.

1. Write the sum of a rational and irrational number.
2. If $x + \frac{1}{x} = 5$, then find the value of $x^2 + \frac{1}{x^2}$.
3. The points (-4, 0) and (7, 0) lie on which axis?
4. If $x = 2$ and $y = 1$ are solutions of equation $9kx + 12ky = 90$, then find the value of k.

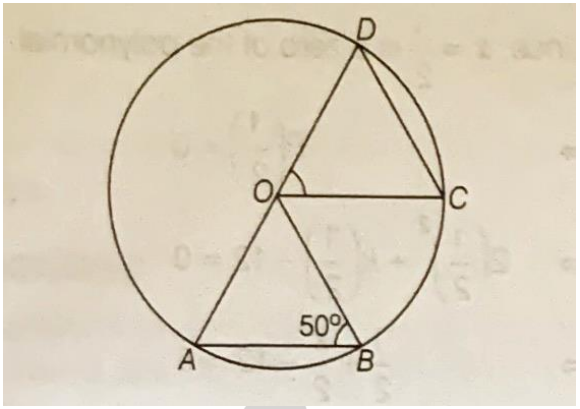
   OR

   If $x = k^2$ and $y = k$ is a solution of the equation $x - 7y + 12 = 0$, find the value of k.
5. Find the length of the chord which is at a distance of 4 cm from the center of a circle of radius 5 cm.
6. Find the length of each side of an equilateral triangle having an area of $\sqrt{3}$ cm^2.
7. If $x = \frac{1}{2}$ is a zero of the polynomial $2x^2 + kx - 12$, then find value of k.
8. The graph of the equation $x = a$ is a straight line parallel to which axis?
9. In a cylinder, if radius is doubled and height is halved, then find curved surface area.

   OR

   In a right circular cone, if radius is four-time and slant height is one-fourth, then find the curved surface area.

10. In the given figure, chords AB and CD are equal. If $\angle OBA = 50°$, then find the measure of $\angle COD$.

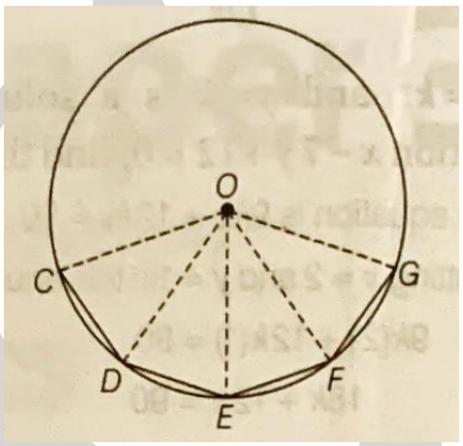


OR

Two circles are congruent, if the radius of one circle is 5 cm, then find the diameter of second circle.

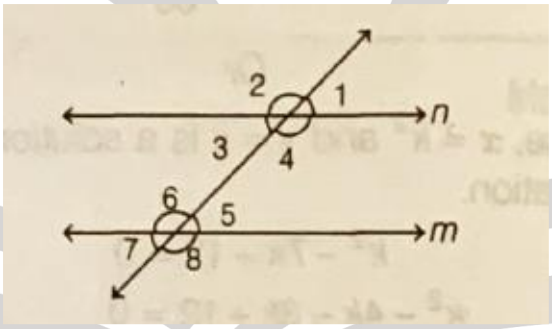
11. The angles of a quadrilateral are 100°, 98°, 92°, respectively. Then, find the fourth angle.

12. In the figure given below, O is the centre of the circle and $CD = DE = EF = GP$. If the $\angle COD = 45°$, then find the reflex $\angle COG$.



OR

In the given figure, $\angle 1 = 60°$ and $\angle 6 = 120°$. Show that the lines m and n are parallel.



13. The radius of the base of the cone is 12 m and its slant height is 9 m. Find its total surface area.

14. The diameters of two right circular cones are equal. If their slant heights are in the ratio 3 : 2, then what is the ratio of their curved surface areas?

OR

A hemispherical bowl is made from a metal sheet having thickness 0.3 cm. The inner radius of the bowl is 24.7 m. Find the outer surface area of the hemispherical bowl.

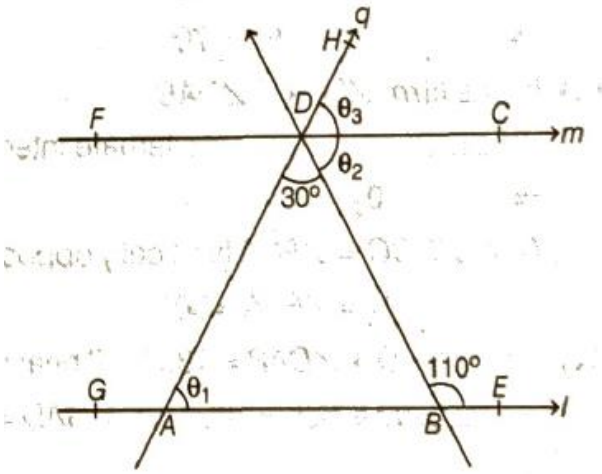
15. Construct an equilateral triangle, given its side $AB = 6$ cm.

16. Two coins are tossed simultaneously 300 times and it is found that two heads appeared 135 times, one head appeared 111 times and no head appeared 54 times. If two coins are tossed at random, what is the probability of getting 2 heads?

Section – II

Directions (Q.Nos.17-20) Case study based questions are compulsory. Attempt any four sub-parts of each question. Each sub-part carries 1 mark.

17. In game period, the teacher of Meerut Public School decided to play the puzzle game. For this game, firstly the teacher draws a geometrical figure on the ground, which is shown as below.



Here, line l is parallel to m and q is a transversal line. While drawing this figure, the teacher has no scale for measuring this length, but they know the side which is opposite to the smallest angle, is smaller and the side which is opposite to the largest angle, is larger. In this game, the teacher invites the two students Vicky and Vishal and said to them that specially Vicky stands on point A and Vishal stands on point B, respectively (assume that both have same space of walking). Then, answer the following questions, which are based on above data.

i. Measure of $\angle ABD$ is
- (a) 70°
- (b) 80°
- (c) 90°
- (d) 100°

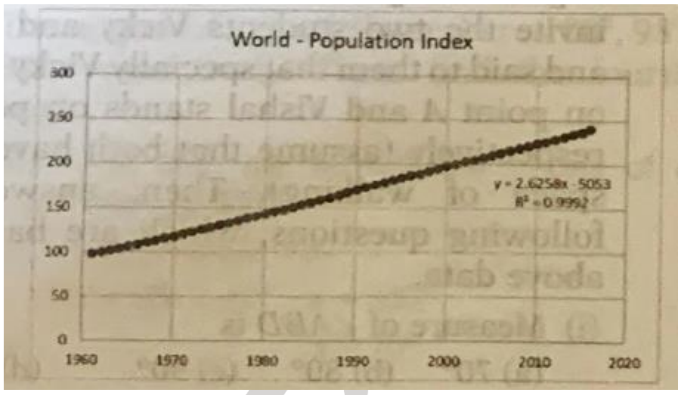
ii. Measure of $\angle\theta_1$ is
- (a) 70°
- (b) 80°
- (c) 90°
- (d) 100°

iii. Measure of $\angle\theta_2$ is
- (a) 60°
- (b) 70°
- (c) 80°
- (d) 90°

iv. Measure of $\angle\theta_3$ is
- (a) 60°
- (b) 70°
- (c) 80°
- (d) 90°

v. Measure of $\angle GAD$ is
- (a) 100°
- (b) 90°
- (c) 110°
- (d) 120°

18. India faces a major population crisis due to the growing population. India ranks second in list of most populated countries. So Kailash Vidhyarti's NGO decided to start a Campaign related to family planning and its benefit to our society, for this purpose, they collect some data of 2000 families.



According to the collected data, out of 2000 families, 650 families have 1 child 450 families have 2 children, 350 families have 3 children, 250 families have 4 children and rest of families have more than 4 children. Then, answer the following questions, which are based on above data.

i. Find the probability of having 1 child.
   (a) $\frac{11}{40}$
   (b) $\frac{13}{40}$
   (c) $\frac{17}{40}$
   (d) $\frac{19}{40}$

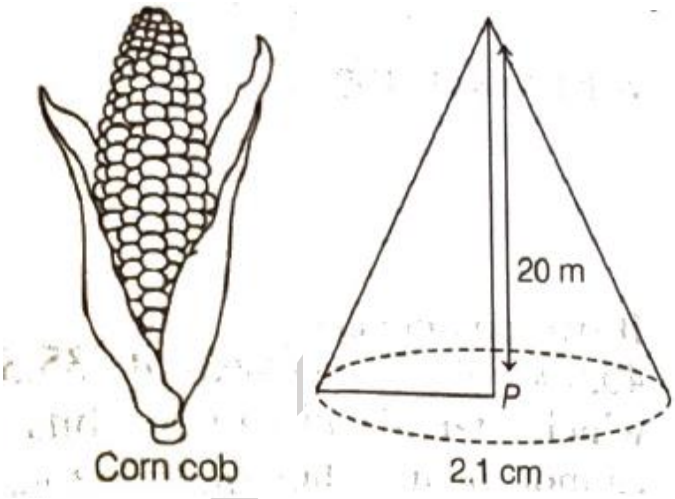
ii. Find the probability of having 2 children.
   (a) $\frac{11}{40}$
   (b) $\frac{7}{40}$
   (c) $\frac{9}{40}$
   (d) $\frac{13}{40}$

iii. Find the probability of having 3 children.
   (a) $\frac{7}{40}$
   (b) $\frac{9}{40}$
   (c) $\frac{11}{40}$
   (d) $\frac{13}{40}$

iv. Find the probability of having 4 children.
   (a) $\frac{1}{7}$
   (b) $\frac{1}{6}$
   (c) $\frac{1}{8}$
   (d) $\frac{1}{10}$

v. Find the probability of having more than 4 children.
   (a) $\frac{3}{20}$
   (b) $\frac{1}{20}$
   (c) $\frac{7}{20}$
   (d) $\frac{9}{20}$

19. A farmer Ramesh grows a corn cob in his farm. Corn cob contains valuable vitamin B, antioxidants, carotenoids, lutein and zeaxanthin which are useful for body grow.



A corn cob (above figure). Shaped somewhat like a cone, it has the radius of its broadest end as 2.1 cm and length as 20 cm. Then, answer the following questions, which are based on above data.

i. Slant height of the conical corn cob is
   (a) 19.11 cm
   (b) 20.11 cm
   (c) 18.11 cm
   (d) 21.11 cm

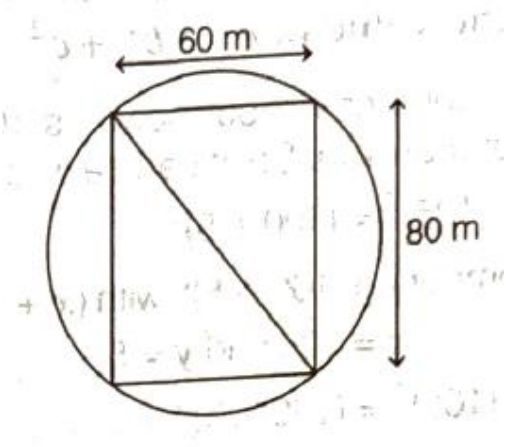
ii. Write the formula to find the curved surface area of cone
   (a) $\pi r^2 h$
   (b) $\pi r l$
   (c) $2\pi r h$
   (d) $2\pi r(r + h)$

iii. Curved surface area of the corn cob is (in cm^2)
   (a) 132.73
   (b) 122.73
   (c) 112.73
   (d) 104.73

iv. If each 1 cm^3 of the surface of the cob carries an average of 4 grains, then find how many grains you would find on the entire cob.
   (a) 532
   (b) 531
   (c) 432
   (d) 431

v. Write the formula to find the total surface area of cone.
   (a) $\pi r l$
   (b) $\pi r(l + r)$
   (c) $2\pi r h$
   (d) $\pi r^2 h$

20. The Indian Hockey federation organized a friendly hockey match between India and Pakistan on a circular ground. The sale proceeds of this match shall be donated to an orphanage. A rectangular turf is spread on the ground as shown in the figure.



Then, answer the following questions, which are based on above data.

i. The radius of the stadium
   (a) 50 m
   (b) 40 m
   (c) 60 m
   (d) 70 m

ii. Write the formula to find the area of rectangular field
   (a) lb
   (b) $\frac{lb}{2}$
   (c) $\frac{lb}{3}$
   (d) $2(l + b)$

iii. Find the perimeter of circular ground
   (a) 214.28 m
   (b) 314.28 m
   (c) 114.28 m
   (d) 414.28 m

iv. Perimeter of rectangular ground is
   (a) 180 m
   (b) 280 m
   (c) 160 m
   (d) 220 m

v. Write the formula to find the area of circular ground.
   (a) πr
   (b) $2\pi r$
   (c) πr^2
   (d) $\frac{\pi r^2}{2}$

PART B

Directions (Q.Nos. 21-26) These are Very Short Answer Type questions of 2 marks each.

21. Evaluate $(105)^3$ by using suitable identify.

OR

If $a + b + c = 10$ and $ab + bc + ca = 36$, then find the value of $a^2 + b^2 + c^2$.

22. Following distribution table gives the weights of 48 passengers of a bus.

Weights (in kg)	Number of passengers
31-35	12
36-40	7
41-45	14
46-50	7
51-55	2
56-60	6
Total	48

If two passengers of weights 35.5 kg and 40.5 kg are bounded in the bus, then in which interval will we include them? If we cannot include them in given table, then construct the new table to include them.

23. Construct a ΩPQR, in which $QR = 6.5$ cm, $Q = 60°$ and $PR - PQ = 1.5$ cm.

24. Evaluate $\left(\frac{81}{16}\right)^{-3/4} \times \left[\left(\frac{9}{25}\right)^{3/2} \div \left(\frac{5}{2}\right)^{-3}\right]$.

OR

Simplify $\frac{1}{5+\sqrt{7}}$.

25. The internal and external diameters of a hollow hemispherical vessel are 24 cm and 25 cm, respectively. The cost to paint 1 cm^2 the surface is ₹ 0.05. Find the total cost to paint the vessel all over. [take $\boldsymbol{\pi = \frac{22}{7}}$]

26. The sides of a triangular park are 8 m, 10 m and 6 m, respectively. A small circular area of diameter 2 m is to be left out and the remaining area is to be used for growing roses. How much area is used for growing roses? [take $\boldsymbol{\pi = 3.14}$]

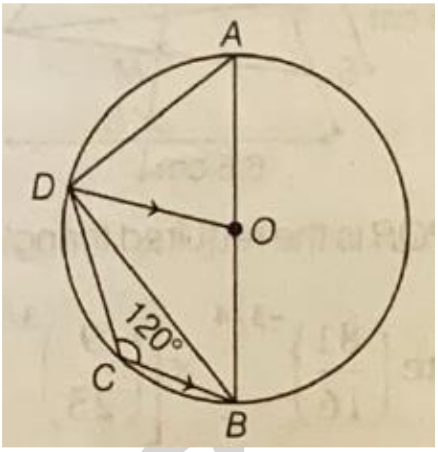
Directions (Q.Nos. 27-33) These are Short Answer Type questions of 3 marks each.

27. Write the coordinates of the vertices of a rectangle, whose length and breadth are 6 units and 3 units respectively, one vertex at the origin, the longer side lies on the Y-axis and one of the vertices lies in the II quadrant. Also, find the area of the rectangle.

28. If two circles intersect in two points, prove that the line through their centres is the perpendicular bisector of the common chord.

OR

In the given figure, AB is a diameter of a circle with centre O and $DO \parallel CB$.

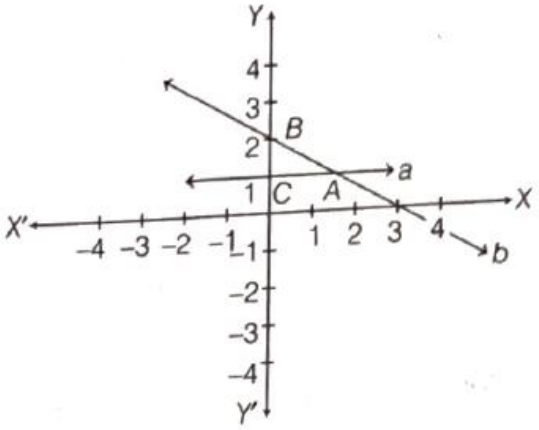


If $\angle BCD = 120°$ and $\angle DAB = 60°$, then calculate

i. $\angle DBA$ ii. $\angle CBD$

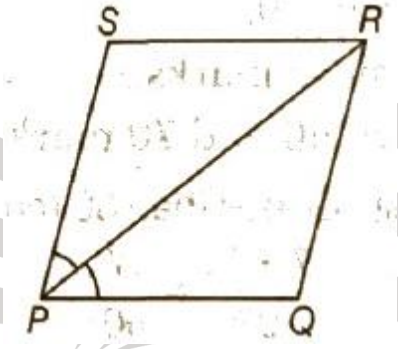
Also, show that ΩAOD is an equilateral triangle.

29. A student wrote the equations of the lines a and b drawn in the following graph as $y = 1$ and $2x + 3y = 6$, respectively. Is he right? If yes, then write the coordinates of point of intersection of lines a and b.



Also, find the area enclosed between these lines and Y-axis.

30. Diagonal PR of a parallelogram PQRS bisects $\angle P$ (see the figure).



Show that

i. It bisects $\angle R$ also.

ii. PQRS is a rhombus.

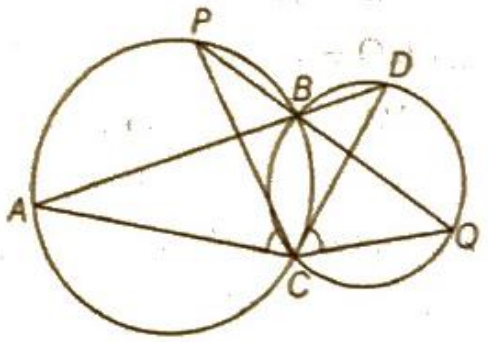
31. Following table shows the marks scored by a group of 90 students in a mathematics test of 100 marks.

Marks	Number of Students
0-20	7
20-30	10
30-40	10
40-50	20
50-60	20
60-70	15
70-80	8

A student is selected at random. Find the probability that student has obtained

i. Less than 30.
ii. 60 or more marks.
iii. Between 40 and 70 marks.

32. Two circles intersect at two points B and C. Through B, two line segments ABD and PBQ are drawn to intersect the circles at A, D, P and Q respectively (see figure). Prove that $\angle ACP = \angle QCD$.



OR

ABCD is a cyclic quadrilateral whose diagonals intersect at a point E. If $\angle DBC = 70°$ and $\angle BAC = 30°$, then find $\angle BCD$. Further, if $AB = BC$, find $\angle ECD$.

33. BE and CF are two equal altitudes of a ΩABC. Using RHS congruence rule, prove that the ΩABC is an isosceles.

Directions (Q.Nos. 34-36) These are Long Answer Type questions of 5 marks each.

34. There are two friends Swati and Sapna who live in a village. Their common friend Monika fell ill. She was admitted in a hospital. Swati and Sapna decided to help Monika. Swati contributed as much money as the fifth root of the cube of amount contributed by Sapna. If the product of amount distributed by two friends is ₹ 390625, then find the contribution of each friend.

35. The linear equation that converts Fahrenheit(°F) to Celsius (°C) is given by the relation (°C) = $\frac{5°F-160}{9}$

(a) If the temperature is 86°F, what is temperature in Celsius?
(b) If the temperature is 35°C, what is temperature in Fahrenheit?
(c) If the temperature is 0°, what is temperature in Fahrenheit and is the temperature is 0°F, what is temperature in Celsius?
(d) What is numerical value of the temperature which is same in both the scales?

36. the quadrilateral formed by joining the mid-points of the consecutive sides of a square, is also a square.

OR

ABCD is a trapezium in which $AB \parallel DC$ and $AD = BC$. If P, Q, R, S are the mid-points of BA, BD, CD AND CA respectively, then show that PQRS is a rhombus.