

KANNUR DISTRICT PANCHAYATH
DIET KANNUR
MUKULAM SSLC MODEL EXAMINATION- 2020
MATHEMATICS

Time: $2\frac{1}{2}$ hours

Score: 80

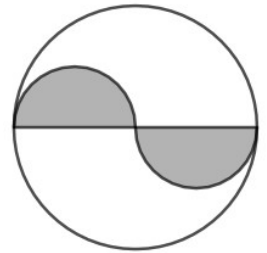
Instructions

- Read each questions carefully before writing the answer.
- Give explanations wherever necessary
- No need to simplify irrationals $\sqrt{2}$, $\sqrt{3}$, π etc using approximations unless you are asked to do so
- First 15 minutes is cool off time.

Answer any three questions from 1 to 4. Each carries 2 score.

1) The algebraic form of an arithmetic sequence is $4n+1$. Write its first three terms. Check whether 101 is a term of this sequence.

2) In the figure, the diameter of the shaded semicircles is equal to the radius of the larger circle. If we put a dot in the figure without looking into it, what is the probability of being the dot in the shaded semicircles?



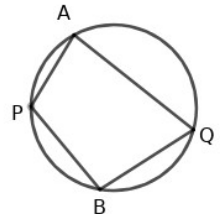
3) $p(x) = 3x^2 + 2x + 1$

- a) Find $p(1)$.
- b) Write one of the factors of $p(x) - p(1)$.

4) Find the equation of the circle with centre at the origin and radius 5. The x coordinate of a point on this line is 3. What is its y coordinate?

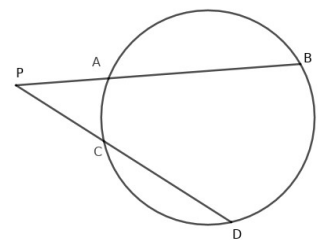
Answer any 5 questions from 5 to 11. Each carries 3 score.

- 5) In figure,
- a) Find the sum of the central angles of arc APB and arc AQB.
 - b) Find $\angle APB + \angle AQB$
 - c) If $\angle AQB = 70^\circ$, then $\angle APB = \dots\dots\dots$



6) Draw a circle of radius 3 centimetre. Mark a point P, 8 centimetres away from the centre of the circle. Draw tangents to the circle from P.

- 7) In the figure, PA=3 centimetre, AB=13 centimetre and CD=8 centimetre.
- a) Find $PC \times PD$
 - b) Find the length of PC.

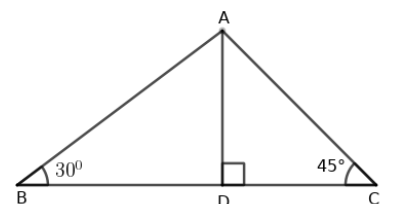


8) A circular disk of radius 12 centimetres is cut into three equal parts and three cones are made by bending each part.

- a) What is the radius of each cone?
- b) Find the curved surface area of one cone?

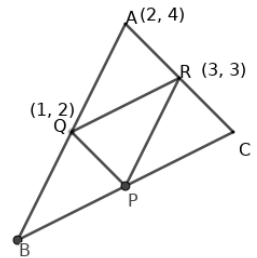
9) In triangle ABC, $AC=6\sqrt{2}$ centimetre, $\angle B = 30^\circ$, $\angle C = 45^\circ$

- a) Find the length of AD
- b) Find the area of triangle ABC .



10) Draw the X ,Y axis and mark the points O(0,0), A(5,0), B(6,4), C(-1,4). Draw the polygon connecting these points taken in order and write its appropriate name.

11) In figure, P,Q and R are the mid points of the sides of triangle ABC. The coordinates of A, Q and R are (2,4), (1,2), (3,3) respectively. Find the coordinates of B, P and C.



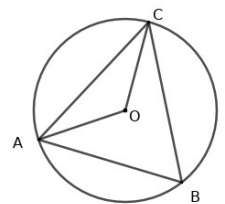
Answer any 7 questions from 11 to 21. Each carries 4 scores.

12) The medians of first 15 terms of two arithmetic sequences with same common difference are 25 and 28.

- Find the sum of first 15 terms of these two arithmetic sequence.
- What is the difference between the sum of first hundred terms of these two sequences?

13) In figure, O is the centre of the circle.

- If $\angle ABC = x$, then $\angle AOC = \dots\dots\dots$
- Prove that $\angle OAC + \angle ABC = 90^\circ$.



14) In triangle ABC, $\angle A = 50^\circ$, $\angle B = 70^\circ$ and BC=10 centimetre.

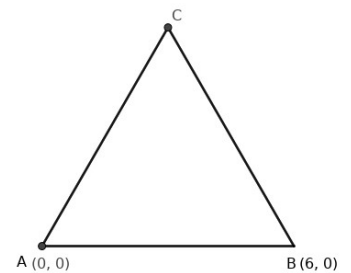
- Find the circum radius of the triangle?
- Find the length of AC.
($\sin 50 = .76$, $\cos 50 = .64$, $\tan 50 = 1.19$; $\sin 70 = .93$, $\cos 70 = .34$, $\tan 70 = 2.74$)

15) Natural numbers from 1 to 10 are written on slips of papers and put in a box. Multiples of three which is less than 20 are written on slips of papers and put in another box. If one slip is to be taken from each,

- In how many different ways can we choose a pair of slips, one from each box.
- What is the probability of both being even?
- What is the probability of getting at least one odd ?

16) Consider an equilateral triangle ABC with A(0,0) and B(6,0)

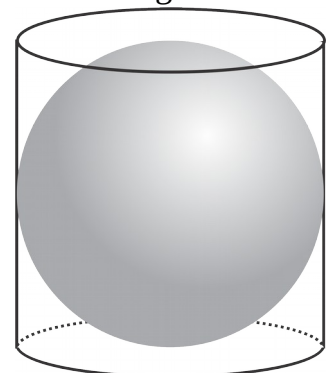
- Find the length of its sides.
- Find the coordinates of the incentre of this triangle.



17) In triangle ABC, AB=6 centimetre, AC=7 centimetre, $\angle A = 70^\circ$. Construct the triangle and draw its incircle.

18) Consider a sphere and a cylinder which can cover this sphere precisely.

- If the radius of the sphere is r, then the surface area of the sphere is
- Find the ratio of the surface areas of these sphere and cylinder.
- What is the ratio of volumes of these cylinder?



- 19)a) Consider any two points on the line passing through (2,5) and (4,9). How many times of change in x coordinates is that of y coordinates?
 b) If the x coordinate of a point on this line is 7, then what is its y coordinate?
 c) Write the equation of this line.

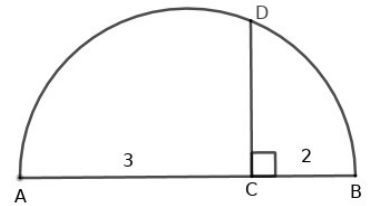
- 20)a) Write $x^2 - 3x + 2$ as a product of two first degree polynomials?
 b) If $x - 3$ is a factor of $x^2 - 3x + 2 + k$, then find the value of k.

- 21)a) If $1+2+3+ \dots + n = 365$, what is the value of n?
 b) How many terms of the arithmetic sequence 4,8,12, should be added to get 1860.

Answer any five questions from 22 to 28. Each carries 5 score.

- 22) Consider the arithmetic sequence 7,11,15,.....
 a) What is its 20th term?
 b) Find the sum of its first 20 terms?
 c) Is the sum of any two terms of this sequence will be a term in this sequence. Why?

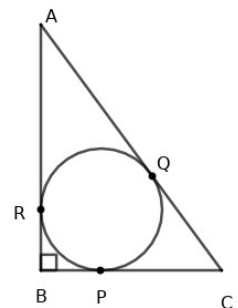
- 23)In figure AB is the diameter and CD is perpendicular to AB. AC=3 centimetre and BC=2 centimetre.
 a) Find the length of CD?
 b) What is the area of the square whose one side is BC?
 c) Construct a square having area 15 square centimetre.



- 24)The table below shows the workers in factory sorted according to their daily wages.

Daily wages	Number of workers.
300 - 400	4
400 - 500	6
500 - 600	10
600 - 700	8
700 - 800	4
800 - 900	3

- a) If the workers are arranged in increasing order of daily wages, what is the position of the worker whose wages is median.
 b) What is assumed to be the daily wages of 11th worker?
 c) Find the median wages?
- 25)Two buildings in a plane ground are 20 metres apart. From the top of the smaller building, one sees the base of larger building at a depression of 54° and its top at an elevation of 32° .
 a)Find the height of the smaller building?
 b) Find the height of the larger building?



- 26)In triangle ABC, AB=8 centimetre, BC=6 centimetre and $\angle B = 90^\circ$.
 a) Find the area of triangle ABC?
 b) Find the radius of its incircle?
 c)Find the length of AQ?
 d) Find $AQ \times QC$

- 27) a) The Base edge of a square pyramid is 5 centimetre and its height is 9 centimetre. Find its volume?
 b) What is the volume the square pyramid with same base edge and height 3 times that of the above pyramid?
 c) The base edges of two square pyramids with same height are in the ratio 1:3. How much times the volume of first square pyramid is that of second?
 d) Among two square pyramids, the base edge and height of second pyramid is 3 times that of first. How much times the volume of first square pyramid is that of second?
- 28) The coordinates of the points A and B are (1,2) and (13,8).
 a) Find the coordinate of the point that divides AB in the ratio 1:2.
 b) P is a point on the line passing through A and B. If the x coo of P is 19, then what is its y coordinate?

Read the given passage correctly and write answers to the following questions.

- 29) Consider the arithmetic sequences
 3,7,11,15 and
 5,9,13,17,.....
 Let us write the sequence obtained by adding terms in same positions. Sum of first terms is $3+5=8$, sum of second terms is $7+9=16$,
 Continuing like this we get the new sequence as 8,16,24,32,.....
 This is an arithmetic sequence with common difference 8.
 Let us consider the following arithmetic sequences.
 3,7,11,15, and
 8,14,20,26,.....
 The sequence of sum of terms in same positions of these sequence is 11,21,31,.....
 The common difference of this new sequence is 10, the sum of common differences of the above sequences.(4+6)
 Now let us consider the sequence obtained by writing the differences of terms in same positions of the above sequences.
 5,7,9,.....
 It is also an arithmetic sequence.
- a) Consider the arithmetic sequences
 2,6,10,14,..... and
 8,17,26,35,.....
- Write the sequence of sum of terms in same positions of these two sequences.
 - What is the common difference of the arithmetic sequence obtained by writing the difference of terms in same positions of these two sequences.
 - Write the sequence obtained by writing the product of terms in same position. Is this an arithmetic sequence?
- b) Write the sequence of differences of terms in same positions of the following sequences.
 2,7,12,17,..... and
 8,13,18,23,.....
- c) What is the common difference of an arithmetic sequence obtained by multiplying terms of an arithmetic sequence by 5.