WANDOOR GANITHAM - S S L C MODEL QUESTION PAPER 2021

PREE3 **MATHEMATICS** **Maximum score : 80**

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

Instructions :

- **20 minutes is given as cool - off time . Use cool – off time to read the questions and plan your answers .**
- **Attempt the questions according to the instructions .**
- **Keep in mind the score and the time while answering the questions .**
- **The maximum score for questions 1 to 45 will be 80 .**
- **Simplify using the appropriate values of** π , $\sqrt{2}$, $\sqrt{3}$ **only if it is asked to do in questions**

For questions from 1 to 5 one score each (Choose the correct answer from the bracket)

1) First term of an arithmetic sequence of algebraic form 3 n + 1 is _____

(3 , 1 , 4 , 6)

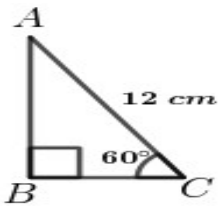
2) The sum of the central angles of an arc and its alternate arc is _____

(180^0 , 90^0 , 270^0 , 360^0)

3) Which number is to be added to $x^2 + 12x + 20$ **to get a perfect square ?**

(144 , 36 , 16 , 400)

4) In the figur $\angle B = 90^o, \angle C = 60^o, AC = 12\,cm$ **. What is the length of** BC **?**



($6\sqrt{2}cm$, $6\sqrt{3}cm$, $12\,cm$, $6\,cm$)

5) Which among the following is a point on the y- axis ?

((0 , 1) , (2 , 0) , (1 , 1) , (2 , 2))

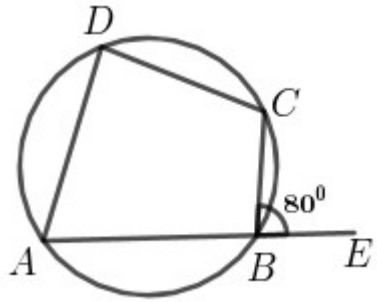
For questions from 6 to 10 carries 2 scores each .

6) Consider the arithmetic sequence 7 , 11 , 15 , ...

a) What is its common difference ?

b) Find the position of the term got by adding 40 to the tenth term of this sequence ?

7) In the figure < CBE = 80 ^{0}



a) What is the measure of < ABC ?

b) What is the measure of < ADC ?

8) Consider the line passing through the points (1 , 2) and (3 , 7) .

a) What is its slope ?

b) Write the coordinates of another point on this line ?

9) The slant height of a cone is 20 centimetres and it makes an angle 30^0 with its radius .

a) What is its radius ?

b) Compute its curved surface area ?

10) Write $36x^2-49$ **as the product of two first degree polynomials ?**

For questions from 11 to 20 carries 3 scores each .

11) The vertices of a triangle are points on a circle of radius 4 centimetres . If two angles of this triangle are 60^0 and 80 ^{0} , draw the triangle ?

12) 6th term of an arithmetic sequence is 25 and its 10th term is 41 .

a) What is its common difference ?

b) What is algebraic form ?

c) Find the position of 201 in this sequence ?

13) Numbers from 1 to 25 are written on slips of paper and put in a box . A slip is to be drawn from it .

a) What is the probability that the number written in it is an even number ?

b) What is the probability that the number written in it is an odd number ?

c) What is the probability that the number written in it is a perfect square ?

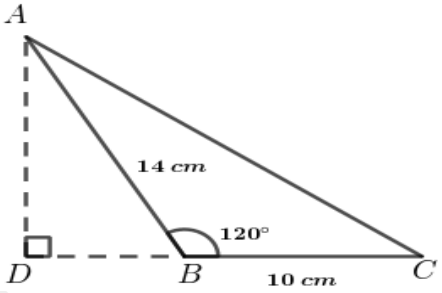
14) The marks of 8 students in an exam are given below .

44 , 73 , 57 , 34 , 62 , 44 , 38 , 48

a) What is the mean mark ?

b) What is the median mark ?

15) In the figure $< ABC = 120^0, < D = 90^0, AB = 14\,cm, BC = 10\,cm$



a) What is the measure of $< ABD$ **?**

b) What is the length of AD **?**

c) What is the area of the triangle ABC **?**

16) In a second degree polynomial $p(x)$ **,** $p(2)=0, p(3)=0$ **and the coefficient of** x^2 **is 1 .**

a) Write a factor of $p(x)$ **?**

b) Write $p(x)$ **as the product of two first degree polynomials ?**

c) What number should be subtracted from $p(x)$ **to get a second degree polynomial with** $x-1$ **as a factor ?**

17) Draw a circle of radius 3 centimetres and draw a diameter . Draw tangents through the ends of this diameter .

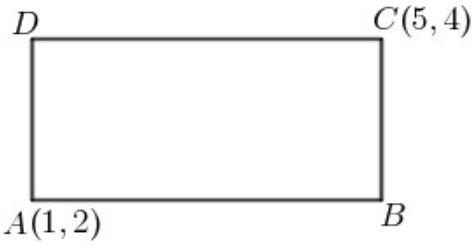
18) From a circular sheet of radius 12 centimetres , a sector of central angle 120^0 is cut out and made into a cone .

a) What is the slant height of the cone ?

b) What is the base radius of the cone ?

c) What is the base radius of another cone made by rolling up the remaining portion of the circular sheet ?

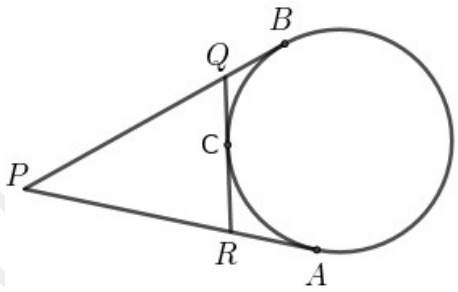
19) In the figure ABCD is a rectangle and its sides are parallel to the axes . The coordinates of A are (1 , 2) and those of C are (5 , 4) .



a) What are the coordinates of B and D ?

b) Write the coordinates of the point of intersection of the diagonals ?

20) In the figure , tangents through the points A and B of a circle intersect at P . QR is a tangent through C



a) Which other line has the same length as that of PA ?

b) Which other line has the same length as that of RC ?

c) Prove that the perimeter of the triangle PQR is double the length of PA ?

For questions from 21 to 30 carries 4 scores each .

21) Draw a rectangle of width 5 cm and height 3 cm . Draw a square of the same area .

22) a) What is the common difference of the sequence 6 , 11 , 16 , ... ?

b) What is the common difference of the sequence 9 , 14 , 19 , ... ?

c) What is the difference between the 15^{th} terms of the above sequences ?

d) What is the difference between the sum of first 15 terms of the above sequences ?

23) A man standing away from the bottom of a tower sees its top at an elevation of 60^0. Standing back by 50 metres , he sees it an elevation of 30^0 .

a) Draw a rough figure based on the given details ?

b) What is the height of the tower ?

24) The figure shows two parallel sides of a square extended by 6 centimetres to make a rectangle .The area of the new rectangle is 391 square centimetres .

a) Write a second degree equation by taking the side of the square as x

b) Compute the length of the side of the square .

25) The base perimeters of two cones are in the ratio 2 : 3 and their heights are in the ratio 5 : 4 .

a) If the height of the first cone is taken as 5h , what is the height of the second cone ?

b) What is the ratio of the base radii of the cones ?

c) What is the ratio of the volume of the cones ?

d) What is the volume of the second cone , if the volume of the first cone is 400π cubic centimetres ?

26) A circle is drawn with the line joining the points A (1 , 3) and B (7 , 3) as diameter .

a) What are the coordinates of the centre of the circle ?

b) Compute the radius of the circle ?

c) Write the coordinates of another point on a line passing through the point (0 , 3) parallel to the x - axis ?

d) Write the coordinates of a point at which the line passing through the centre of the circle perpendicular to the diameter AB meets the circle ?

27) If $p(x)=x^2-6x+k$

a) Find $p(2)$?

b) Find the value of k if $x-2$ is a factor of $p(x)$?

c) Write $p(x)$ as the product of two first degree polynomials by substituting the value of k

28) 45 households in a neighbourhood are sorted according to their monthly income in the table below .

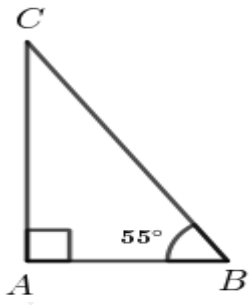
Monthly income (Rs)	Number of households
10000	5
20000	7
30000	8
40000	10
50000	8
60000	7

a) If the households are arranged in increasing order of monthly income , what is the monthly income of the household at the 21st position ?

b) If the households are arranged in increasing order of monthly income , the monthly income of the household at what position is taken as the median ?

c) Find the median of the monthly income ?

29) In the triangle ABC , $\angle A = 90^0, \angle B = 55^0$ **.**



a) What is the measure of $\angle C$ **?**

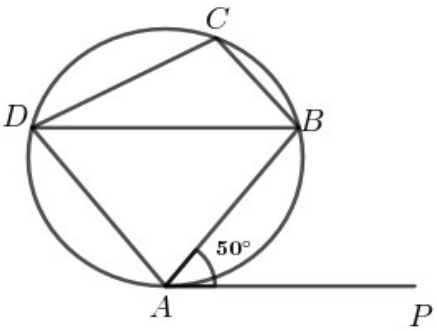
b) Which among the following is $\sin 55^0$ **?**

$$\left(\frac{AB}{BC} \ , \ \frac{AC}{BC} \ , \ \frac{AC}{AB} \ , \ \frac{AB}{AC} \right)$$

c) Similarly write $\cos 35^0$ **from this triangle ?**

d) What is the relation connecting $\sin x^0$ **and** $\cos(90-x)^0$ **if an angle of a right triangle is** x^0 **?**

30) In the figure PA is a tangent . BD is a line parallel to to PA . $\angle BAP = 50^0$



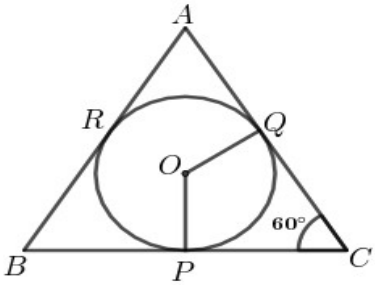
a) What is the measure of $\angle ADB$ **?**

b) What is the measure of $\angle ABD$ **?**

c) What is the measure of $\angle DCB$ **?**

For questions from 31 to 45 carries 5 scores each .

31) a) In the figure the circle touches the sides of the triangle ABC at P , Q and R . If $\angle C = 60^0$ **, what is the measure of** $\angle POQ$ **?**



b) Draw a circle of radius 2.5 cm . Draw the triangle with two angles 60º and 80º and all its as tangents to this circle .

32) Look at the number pattern given below.

1

2 3

4 5 6

7 8 9 10

.....

a) Write the next line of this pattern ?

b) How many numbers are there in the 20^{th} line ?

c) What is the last number in the 19^{th} line ?

d) What are the first and last number in the 20^{th} line ?

33) a) Draw the axes and mark the points A (5 , 1) , B (3 , 4) , C (0 , 4) and D (-1 , 1)

b) Write the most suitable name for the quadrilateral ABCD ?

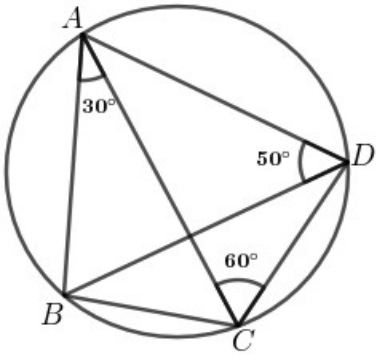
c) Find its area ?

34) 1 added to the product of two consecutive even numbers gives 361.

a) Write a second degree equation by taking the smaller number as x .

b) Find the numbers ?

35) In the figure $< BAC = 30^0$, $< ADB = 50^0$, $< ACD = 60^0$



a) What is the measure of $< BDC$?

b) What is the measure of $< ACB$?

c) What is the measure of $< ABD$?

d) What is the central angle of the arc BCD ?

36) Consider the arithmetic sequence 5 , 8 , 11, ...

a) What is its common difference ?

b) What is its algebraic form ?

c) What is its 20^{th} term ?

d) What is the sum of first 20 terms of this sequence ?

e) What is the sum of first 20 terms of the sequence 9 , 12 , 15 , ... ?

37) A (1 , 2) , B (5 , 6) and C (7 , 4) are the vertices of a triangle .

a) Compute the lengths of the sides of the triangle ?

b) Prove that ABC is a right triangle ?

c) What are the coordinates of the centre of the circumcircle of the triangle ABC ?

38) Consider the polynomial $p(x)=x^2-10x+16$

a) Find $p(1)$ **?**

b) Write a factor of $p(x)-p(1)$ **?**

c) Write $p(x)-p(1)$ **as the product of two first degree polynomials ?**

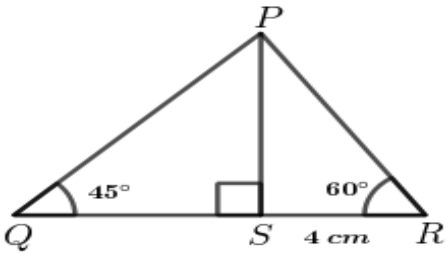
39) A cone of maximum volume is carved out from a solid cylinder of base radius 12 centimetres and height 20 centimetres .

a) Compute the volume of the cylinder ?

b) Compute the volume of the cone ?

c) The remaining portion of the cylinder is melted and recast in to small cones of base radius 6 centimetres and height 10 centimetres . How many small cones can be made ?

40) In the figure $<Q=45^\circ, <S=90^\circ, <R=60^\circ, SR=4\,cm$



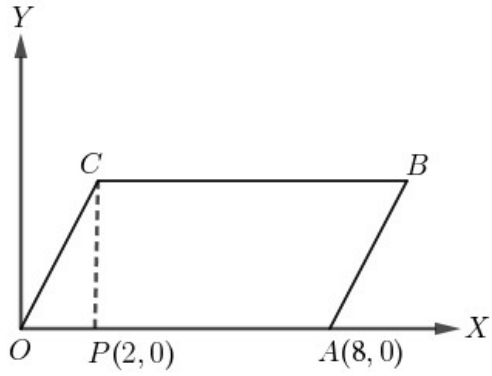
a) What is the length of PS **?**

b) What is the length of QS **?**

c) What is the measure of $<QPR$ **?**

d) What is the ratio of the sides of a triangle with angles 45^0 , 60^0 , 75^0

41) In the figure OABC is a parallelogram . CP is the perpendicular from C to its opposite side . Area of the parallelogram is 40 square centimetres .



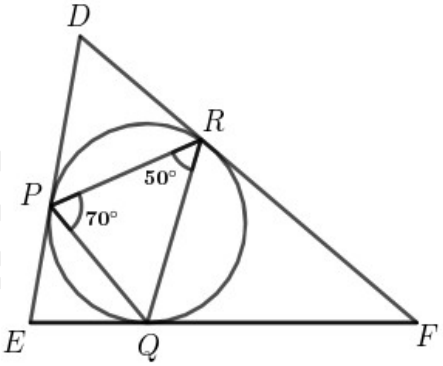
a) What is the length of OA ?

b) Find the distance between the sides OA and BC ?

c) What are the coordinates of B and C ?

42) In the figure circle touches the sides of the triangle DEF at P, Q and R .

< QPR = 70^0 , < PRQ = 50^0

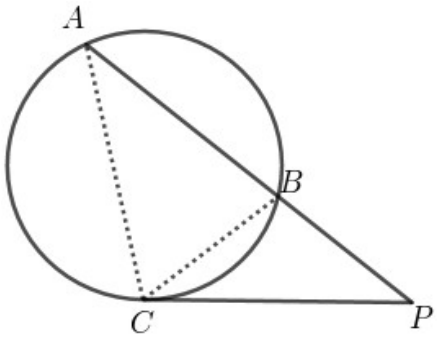


a) What is the measure of < EQP ?

b) What is the measure of < E ?

c) What is the measure of < F ?

43) In the figure , chord AB is extended to meet the tangent through C at P .



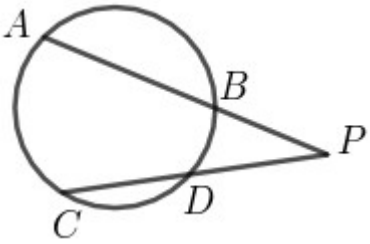
a) If < BCP = 30^0 , What is the measure of < BAC ?

b) Prove that the angles of triangles APC and BPC are same ?

c) Prove that PA x PB = PC^2 ?

44) In the figure chords AB and CD of the circles are extended to meet at P .

PA = 24 cm , AB = 18 cm .The length of PC is 10 cm more than that of PD .



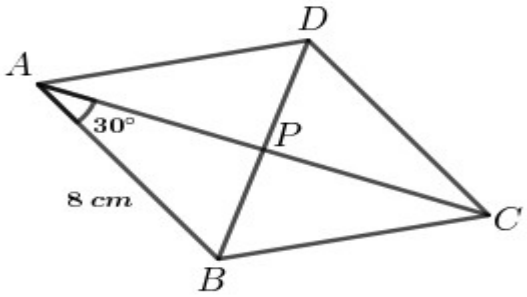
a) What is the length of PB ?

b) PC x PD = ...

c) Write down a second degree equation by taking the length of PD as x .

d) Compute the length of CD ?

45) In rhombus $ABCD$ **, the diagonals intersect at** P **.** $AB = 8\,cm$ **,** $< BAP = 30^\circ$



a) What is the measure of $< APB$ **?**

b) What is the length of PB **?**

c) Compute the lengths of the diagonals ?