SJ Sample Paper
SSLC 2021

Mathematics

Time :2hours 30 minutes
Maximum Marks 80

Questions
Answers

- ⋆ Half of the questions carry full marks
- ⋆ Marks are specified along with the questions

Questions from 1 to 5 carry one mark each.(Choose the correct answer from the bracket)

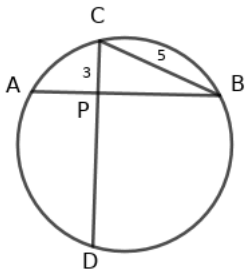
1) An arithmetic sequence has the algebraic form $3n-2$.Which of the following is its common difference?

(a) 1 (b) -2 (c) 3 (d) -1

2) How many odd numbers from 1 in the order makes the sum 900?

(a) 100 (b) 30 (c) 70 (d) 51

3) In the figure AB and CD are perpendicular chords.These chords intersect at P inside the circle.If $PC=3, BC=5, PA=9$ then what is the length PD



(a) 10 (b) 12 (c) 7 (d) 5

4) Sum of a number and its square is 30. Which of the following is the number?

(a) 4 (b) -4 (c) 6 (d) -6

5) In a polynomial $p(x)=ax^2+bx+c$,if $a+b+c=0$ then which of the following is definitly a factor

(a) $x+1$ (b) $x-1$ (c) x (d) $2x-1$

Questions from 6 to 10 carry two score each.

6) Area of a rectangle is 221 sq.cm. The length of one side is 4cm more than the length of other side.

a) If the small side is x then write the equation connecting sides and area.

b) What are the sides of the rectangle?

7) Each letters of the word $MALAYALAM$ are written in small paper pieces and placed in a box.One is taken from the box without looking into the box

a) What is the probability of getting the letter A?

b) What is the probability of not getting the leter A?

8) In triangle ABC all sides are equal and the perimetre is 36cm

a) What is the length of a side?

b) What is the altitude of the triangle?

9) $OABC$ is a rectangle with O the origin of coordinates,$A(4,0)$ and $C(0,3)$.

a) Write the coordinates of B.

b) Calculate the area of the rectangle $OABC$

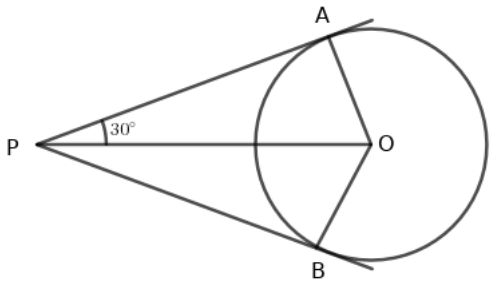
10) Base area of a wooden cylindrical block is 100π cm^2 and height 24cm. A cone of maximum size is carved from it.

a) What is the slant height of the cone so formed?

b) Find curved surface area of this cone.

Questions from 11 to 20 carry three score each.

11) In the figure O is the centre of the circle , PA, PB are the tangents to the circle from P and $\angle OPA = 30^\circ$



a) What is the measure of $\angle APB$?

b) What is the measure of $\angle AOB$?

c) If the radius of the circle is 3cm then what is the langth of the tangent?

12) $A(1,2)$ and $B(5,8)$ are two points on a line and M is the mid point of AB.

a) What is the slope of this line?

b) What is the slope of another line parallel to the line passing through A and B

c) Write the coordinates of the mid point of the line AB.

13) Draw an equilateral triangle whose vertices are on a circle of radius 3cm.

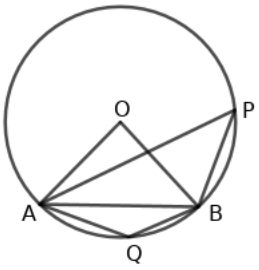
14) The difference between the 5^{th} term and 8^{th} term of an arithmetic sequence is 24.

a) What is the common difference of this sequence?

b) What is the difference between 8 th term and 12 th term of this sequence .

c) If the 20th term is A then what is its 27 th term?

15) In the figure OAB is an equilateral triangle.O is the centre of the circle and P, Q are the points on the circle.



a) What is the measure of $\angle AOB$?

b) What is the measure of $\angle APB$?

c) What is the measure of $\angle AQB$?

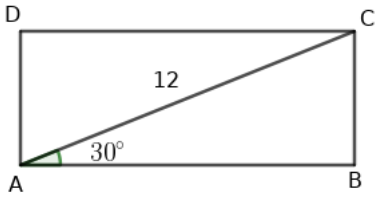
16) Area of a triangle is 144 square cm. One side is 2 cm more than the altitude to that side.

a) If the side of the triangle is x then what is the altitude to the side?

b) Form a second degree equation using the given information.

c) Calculate the length of the side and altitude to the side by solving the equation.

17) The diagonal of the rectangle $ABCD$ is 12cm , $\angle BAC = 30^\circ$



a) What is the length of the side AB?

b) What is the length of the side BC?

c) Calculate the area of the rectangle

1+1

18) In $\triangle ABC$, $A(-1,2), B(7,2), C(5,5)$

a) Which side of the triangle is parallel to x axis?

b) What is the length of the side parallel to x axis and altitude to that side?

c) Calculate the area of the triangle.

19) Draw a circle of radius 3cm. Mark a point P at the distance 7cm from the centre of the circle.Draw tangents to the circle from P.

20) A sectoral sheet of central angle 120° is taken from a circular sheet of area 900πsq.cm. It is rolled in the shape of a cone.

a) What is the curved surface area of the cone so formed?

b) Find the slant height of the cone?

c) Find the radius of the cone?

Questions from 21 to 30 carry four score each.

21) There is a line passing through two points $(1,2), (3,4)$.

a) What relationship you observe between the x coordinates and y coordinates of these points?

b) What is the slope of the line passing through these points ?

c) What are the coordinates of the point where this line cut x axis ?

d) What are the coordinates of the point where this line cut y axis ?

22) $p(x) = 3x^2 + 4x + 1$ is a polynomial.

a) Find $p(1)$

b) Calculate $p(x) - p(1)$

c) Check whether $x - 1$ a factor of $p(x) - p(1)$ or not

d) What integer should be added to $p(x)$ to get a polynomial in which x is a factor.

23) Atmospheric temperature of seven days in Ernakulam city is listed below.

$$26°C, 28°C, 25°C, 24°C, 24°C, 30°C, 28°C$$

a) Arrange the data in the ascending order.

b) What is the median temperature?

c) How many days are there above median temperture?

d) How many temperatures are there above median temperture?

24) $\frac{3}{7}n + 1$ is the algebraic form of an arithmetic sequence.By giving the values $1, 2, 3 \cdots$ to n we get the terms of the sequence.

a) What is the smallest value of n which gives an integer term of this sequence?

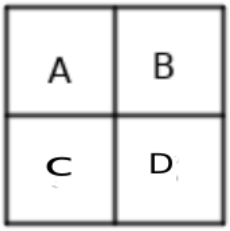
b) Write the integer terms as another sequence.

c) How many integer terms are there below 100

d) Calculate the sum of all integer terms below 100.

25) Draw a rectangle of sides 5 cm and 3 cm. Costruct a square having the area equal to the area of the rectangle.

26) In the grid given below the letters representing day numbers of a calandar.



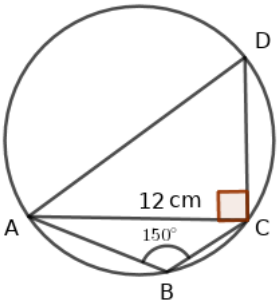
a) If $A = x$ then write B, C and D.

b) If $A \times D = 84$ form a second degree equation.

c) Find A

d) Write the numbers B, C and D

27) The circle shown in the figure is the circumcircle of $\triangle ABC$ as well as $\triangle ACD$.$\angle ACD = 90°, AC = 12$cm , $\angle ABC = 150°$



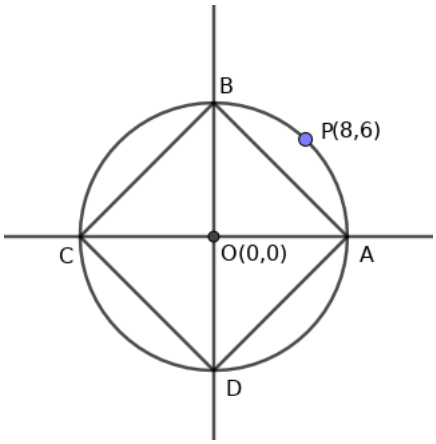
a) What is the measure of $\angle ADC$?

b) What is the radius of the circle.

c) Find the length of CD

d) Calculate the area of $\triangle ACD$.

28) A circle is drawn with centre at the origin.It cuts the axes at A, B, C and D. If $P(8,6)$ is a point on the circle.

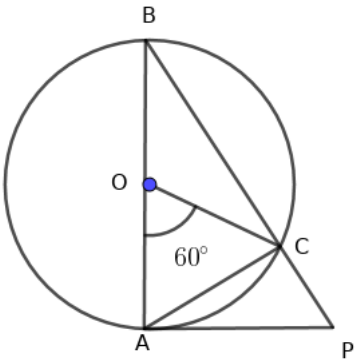


a) Find the radius of the circle.

b) What are the coordiantes of $A, B, C$and D

c) Find the area of the square $ABCD$

29) In the figure AB is the diametre of the circle, O is the centre of the circle and PA is a the tangent at A .Also, $PA = 4$cm and $\angle AOC = 60°$.



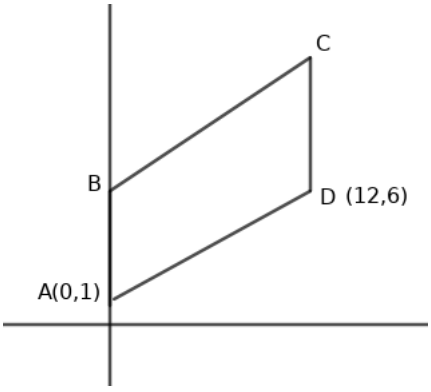
a) What is the measure of $\angle ABC$?

b) What are the angles of $\triangle ABC$?

c) What is the length PC.

d) What is the length PB

30) In the figure $ABCD$ is a parallelogram.Two vertices A and B are on y axis.$A(0,1)$ and $D(12,6)$ Also, the diagonal BD can divide the parallelogram into two equal right triangles.



a) What are the coordinates of B

b) Write the coordinates of C

c) What is the length of parallel sides AB and CD

d) Find the perimetre of the parallelogram.

Questions from 31 to 45 carry five score each.

31) $1^{st}, 3^{rd}, 5^{th} \cdots$ terms of an arithmetic sequence are $7, 15, 23 \cdots$.

a) Insert $2^{nd}, 4^{th}, 6^{th} \cdots$ terms and write the sequence completly

b) Write the algebraic form of the sequence.

c) What is the 15 th term of an arithmetic sequence?

d) What is the sum of first 29 terms of the sequence?

e) Can the sum of any 25 terms of this sequence 2020? How can you realise it?

32) The angles of a quadrilateral are $\angle A = x, \angle B = 4x, \angle C = 4x + 30, \angle D = 2x$

a) Find x

b) What are the angles of $ABCD$?

c) What is the position of B and D based on the circle with diametre AC?

d) The diagonals AC and BD intersect at P inside the circle. Write the relation between the segments PA, PB, PC and PD

e) Can any one of the diagonals be the diametre of the circle passing through the vertices.

33) Area of a right angled triangle is 216 square cm.One of the perpendicular sides is 6 more than the other.

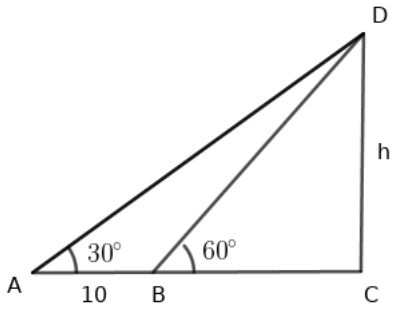
a) If the smallest side is x then what is the side perpendicular to it?

b) Form a second degree equation connecting perpendicular sides and area .

c) Find the perpendicular sides of the triangle.

d) Find the hypotenuse of the triangle.

34) From a point on the plane ground the top of a treeis viewed at an angle of elevation $30°$ marked in the figure.When moved 10metre towards the tree the angle of elevation becomes $60°$. This angle is also marked in the figure.



a) Calculate the distance from the second pont of observation to the foot of the tree

b) Find the height of the tree.

35) $A(6, 1), B(8, 2), C(9, 4)$ are the three vertices of a parallelogram. E is the mid point of CD.

a) Write the coordinates of D

b) Find the length of its sides.

c) Find the coordinates of E

36) In the second degree polynomial $p(x)$, $p(1) = 0, p(-2) = 0$.

a) What are the first degree factors of $p(x)$

b) Write a polynomial satisfying this condition.

c) What number should be added to the polynomial that you wrote to get another polynomial in which $x+1$ a factor.

37) The daily wages of 200 workers in a factory are given below .

Wages	350	400	450	500	550	600
No. Workers	14	50	30	40	36	30

a) Prepare the table for calculating the median.

b) Find the median wage.

c) How many workers are getting median wage and below ?

d) How many workers are getting median wage and above ?

38) Look at the pattern given below

$$1^3 = 1$$
$$1^3 + 2^3 = 9 = 3^2 = (1+2)^2$$
$$1^3 + 2^3 + 3^3 = 36 = 6^2 = (1+2+3)^2$$

We can see an order in this calculaion. This will help us to write more lines below . Answer the following questions

a) How many cubic numbers are there from 1 to 8000?

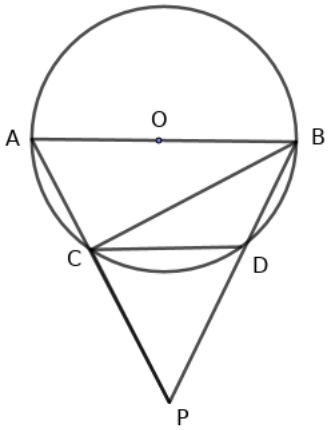
b) Find $1^3 + 2^3 + 3^3 + 4^3$

c) Find the sum of the cubes of all natural numbers from 1 to 6

d) We know that the sum of all natural numbers from 1 to 10 is 55. Calculate $1^3+2^3+3^3 \cdots 10^3$

e) Write a formula to find the sum $1^3 + 2^3 + 3^3 \cdots + n^3$

39) AB is the diametre of the circle.CD is a chord of length equal to radius of the circle.



a) What is the measure of $\angle COD$?

b) What is the measure of $\angle CBD$?

c) What is the measure of $\angle DCP$?

d) Find the measure of $\angle CPD$

40) The denominator of a fraction is 1 more than two times its numerator.The sum of the fraction and its reciprocal is $2\frac{16}{21}$.

a) If the numerator is x what is its denominator.

b) Write the fraction in x

c) Form a second degree equation using the given condition.

d) Find the fraction.

41) The base perimetre of a cone is 20π cm, slant height 18cm .It is made by rolling a sectoral sheet .

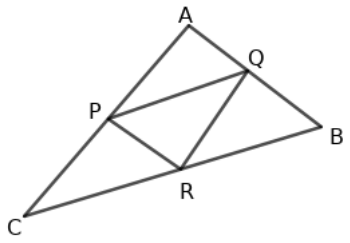
a) What is the radius of the sector?

b) What is the radius of the cone?

c) What is the central angle of the sector?

d) Find the lateral surface area of the cone?

42) Triangle PQR is drawn by joining the mid points of the sides of triangle ABC.



a) How many equal triangles are there in the figure?

b) A fine dot is placed into the figure. What is the probability of falling the dot in triangle PQR?

c) How many parallelograms are there in the picture?

d) A fine dot is placed into the figure. What is the probability of falling the dot in the parallelogram $PQRC$?

e) What is the probability of not falling the dot in the parallelogram $PQRC$?

43) Consider the polynomials $p(x) = x^3 + 1$, $q(x) = x^3 + x^2 + x + 1$

a) Find $p(-1)$ and $q(-1)$

b) What is the factor common to both the polynomials

c) Find $r(x) = p(x) + q(x)$

d) what is the first degree factor of $r(x)$

44) $P(2, -1), Q(3, 4), R(-2, 3), S(-3, -2)$ are the vertices of a quadrilateral.

a) Find the length of sides .

b) What is the length of its diagonals?

c) Suggest a suitable name to this quadrilateral.

d) Calculate the area .

45) Two angles of a triangle are $70°$ and $60°$. A circle of radius 3cm touches its sides inside. Construct the triangle.

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