(Pages : 8) 627

Sl.No.

S.S.L.C. EXAMINATION, MARCH - 2013

MATHEMATICS (English)

Time : 2½ Hours Total Score : 80

Instructions :

1) **Read the questions carefully, understand each question and then answer the questions.**
2) **Give explanations wherever necessary.**
3) **If there is an OR between any two questions, you may answer only one among them.**
4) **15 minutes will be given at the beginning as cool off time. This time may be utilised to read and understand the questions.**
5) **Simplification using irrationals like $\pi, \sqrt{2}$ etc. with their approximate values is not required if not specified in the question.**

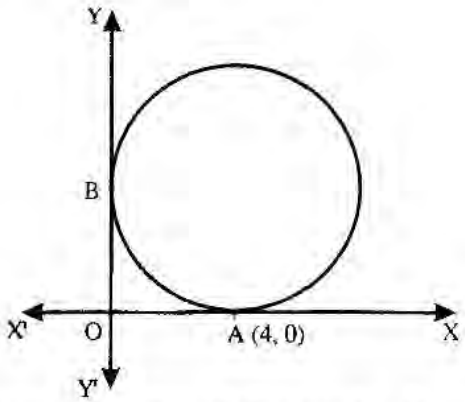
[SCORE]

Q1) Second and fourth terms of the following arithmetic sequence are missing. Find the numbers at these positions. [2]

11, —, 19, —, ...

Q2) If $(x - 2)$ is a factor of the polynomial $3x^3 - 2x^2 + kx - 6$, then what is the value of k? [2]

Q3)



In the figure, C is the centre of the circle. X and Y axes are tangents to the circle at the points A and B respectively. If the coordinates of A are (4, 0), find the coordinates of B and C. [2]

P.T.O.

[SCORE]

Q4) There are 18 beads in a box. Some of them are white and the remaining are black. The Probability of drawing a black bead from it is $\frac{1}{3}$. Then [3]

a) How many black beads are there in the box?

b) How many white beads are there in the box?

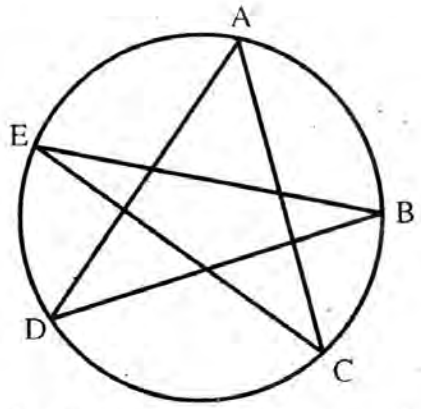
c) How many white beads should be added to it so that the probability of drawing a black bead becomes $\frac{1}{4}$?

Q5) The table below shows the classification of people, participated in a medical camp, according to their weights. [3]

Weight (in kilogram)	Number of people
20 – 30	16
30 – 40	21
40 – 50	28
50 – 60	24
60 – 70	11

Calculate the mean weight.

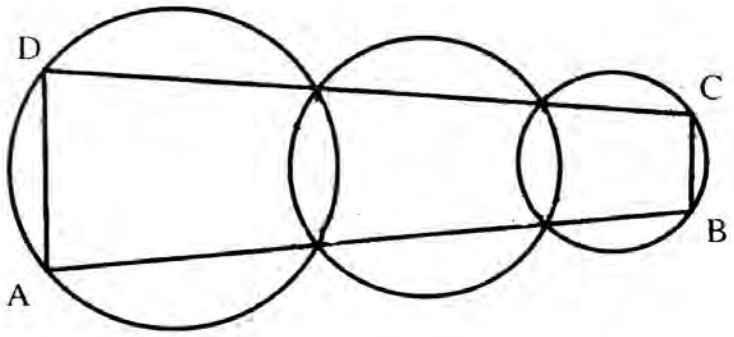
Q6)



In the figure A, B, C, D and E are points on the circle. Prove that $\angle A+\angle B+\angle C+\angle D+\angle E=180^\circ$. [3]

[SCORE]

OR



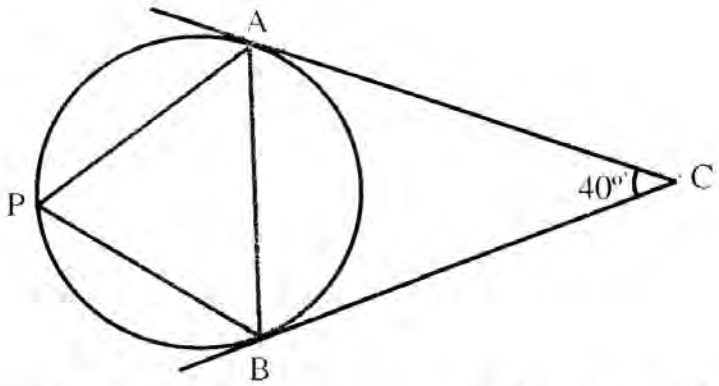
Prove that the quadrilateral ABCD shown in the figure is a cyclic quadrilateral.

Q7) a) Check whether the circle with centre at the point (2, 4) and radius 5 units pass through the point (2, 0).

b) Write the coordinates of the points at which this circle cuts the X axis.

[3]

Q8)



In the figure, CA and CB are tangents to the circle. Also PA = PB and $\angle C = 40°$. Find the angle measures of triangle PAB. [3]

Q9) The sum of first n terms of an arithmetic sequence is $5n^2 + 2n$. [3]

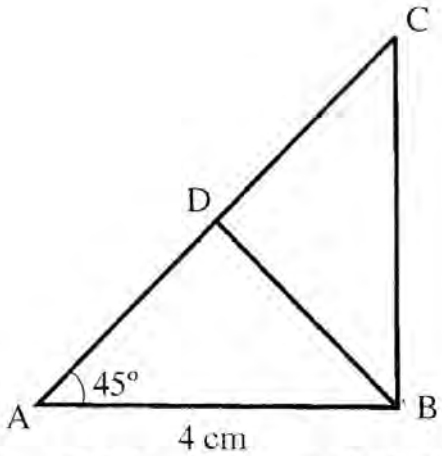
a) What is the sum of first two terms of this sequence?

b) Write the first two terms of this sequence.

[SCORE]

Q10) In a right angled triangle, one of the perpendicular sides is 6 centimetre longer than the other side. If the area of the triangle is 36 square centimetre, find the length of its perpendicular sides. [3]

Q11)



In the figure, ABC is a right angled triangle. AB = 4cm, $\angle A = 45°$ and D is the midpoint of AC. Then find the length of BC, AC and BD. [3]

Q12) All the edges of a square pyramid are of length 12 centimetre. [4]

a) What is the area of one lateral face of it?

b) What is the surface area of this pyramid?

c) How many times the surface area will be, if the length of the sides of this pyramid are doubled?

Q13) a) Write the algebraic form of the arithmetic sequence

1, 4, 7, 10, ...

b) Is 100 a term of this sequence? Why?

c) Prove that the square of any term of this sequence is also a term of it.

[4]

[SCORE]

Q14) a) Draw triangle ABC with AB = 10 cm, $\angle A = 50°$ and $\angle B = 70°$.

b) Draw the incircle of triangle ABC and write the measure of its radius.

[4]

Q15) a) Check whether $(x + 1)$ is a factor of the polynomial $p(x) = 6x^3 + 3x^2$.

b) What first degree polynomial added to $p(x)$ gives a polynomial for which $(x^2 - 1)$ is a factor?

[4]

OR

The remainder on dividing the polynomial $q(x)$ by $(x - a)$ is k and the remainder on dividing the polynomial $r(x)$ by $(x - a)$ is $-k$.

a) Find $q(a)$.

b) Prove that $(x - a)$ is a factor of the polynomial $q(x) + r(x)$.

Q16) The table below shows the classification of 100 families in a locality, according to the amount paid against their electricity bill. [4]

Electricity bill (in Rupees)	Number of families
0 – 200	8
200 – 400	12
400 – 600	21
600 – 800	30
800 – 1000	23
1000 – 1200	6

Find the median of the amount paid.

[SCORE]

Q17) a) Draw a rectangle of sides 5 centimetre and 4 centimetre. Draw a square, equal in area to this rectangle.

b) Draw an isosceles triangle, equal in area to this square.

[5]

Q18) a) The sum of a number and its reciprocal is $\frac{25}{12}$. What is the number?

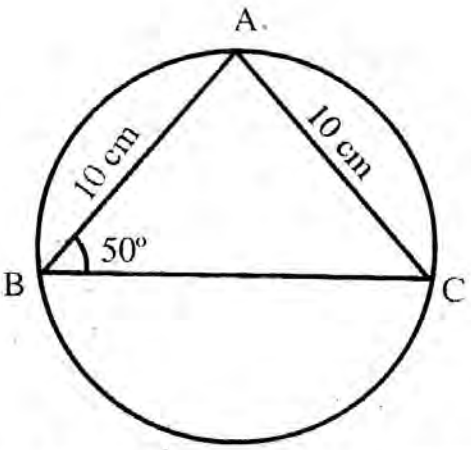
b) Prove that the sum of a positive number and its reciprocal is always greater than or equal to 2.

[5]

OR

To complete a job, Babu needs 6 more days than Abu. If both of them do the job together it takes 4 days to complete it. How many days each one needs, if they do the job separately?

Q19)



In triangle ABC, AB = AC = 10 cm. $\angle ABC = 50°$.

a) Find the length of BC.

b) Find the diameter of the circle.

[sin 50° = 0.77, cos 50° = 0.64, tan 50° = 1.19]

[5]

OR

[SCORE]

Hari, standing on the top of a building, sees the top of a tower at an angle of elevation of 50° and the foot of the tower at an angle of depression of 20°. Height of Hari is 1.6 metre and height of the building on which he is standing is 9.2 metre.

a) Draw a rough sketch according to the given information.

b) How far is the tower from the building?

c) Calculate the height of the tower.

$$\begin{bmatrix} \sin 20^\circ = 0.34,\ \cos 20^\circ = 0.94,\ \tan 20^\circ = 0.36 \\ \sin 50^\circ = 0.77,\ \cos 50^\circ = 0.64,\ \tan 50^\circ = 1.19 \end{bmatrix}$$

Q20) a) The base diameter and slant height of a wooden cone is 10 centimetre each. What is the volume of this cone?

b) If this cone is carved in to a sphere of maximum size, find the volume of the sphere.

[5]

Q21) a) Draw X and Y axes and mark the points A(5, 8) and B(3, 2).

b) If we draw triangle ABC such that the side BC is parallel to the X axis, what will be its height?

c) Draw triangle ABC, such that the side BC is parallel to the X axis and area of the triangle is equal to 15 square units.

[5]

[SCORE]

Q22) Consider the line $4x - 3y - 10 = 0$. [5]

a) Prove that (4, 2) is a point on this line. Find another point on this line.

b) Find the slope of this line.

c) Write the equation of the line with the same slope and passing through the point (3, 5).

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