1. **Assertion (A):**The polynomial p(x)=x^2+3x+3 has two real zeroes. **Reason (R) :** A quadratic polynomial can have at most two zeroes.

   (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).

   (b) Both Assertion (A) and Reason (R) are true and Reason (R) is not the correct explanation of Assertion (A).

   (c) Assertion (A) is true but Reason (R) is false.

   (d) Assertion (A) is false but Reason (R) is true.

2. Prove that $2+\sqrt{3}$ is an irrational number,given that $\sqrt{3}$ is an irrational number.

3. If $4\cot^2 45° - \sec^2 60° + \sin^2 60° + p = \frac{3}{4}$, then find the value of p.

4. If $\cos A + \cos^2 A = 1$,then find the value of $\sin^2 A + \sin^4 A$

5. Show that the points $(-2, 3)$, $(8, 3)$ and $(6, 7)$ are the vertices of a right-angled triangle.

6. The length of the shadow of a tower on the plane ground is $\sqrt{3}$ times the height of the tower. Find the angle of elevation of the sun.

7. The angle of elevation of the top of a tower from a point on the ground which is 30m away from the foot of the tower,is 30°.Find the height of the tower.

8. In the given figure, O is the center of the circle .AB and AC are tangents drawn to the circle from point A. If $\angle BAC = 65°$, then find the measure of $\angle BOC$.

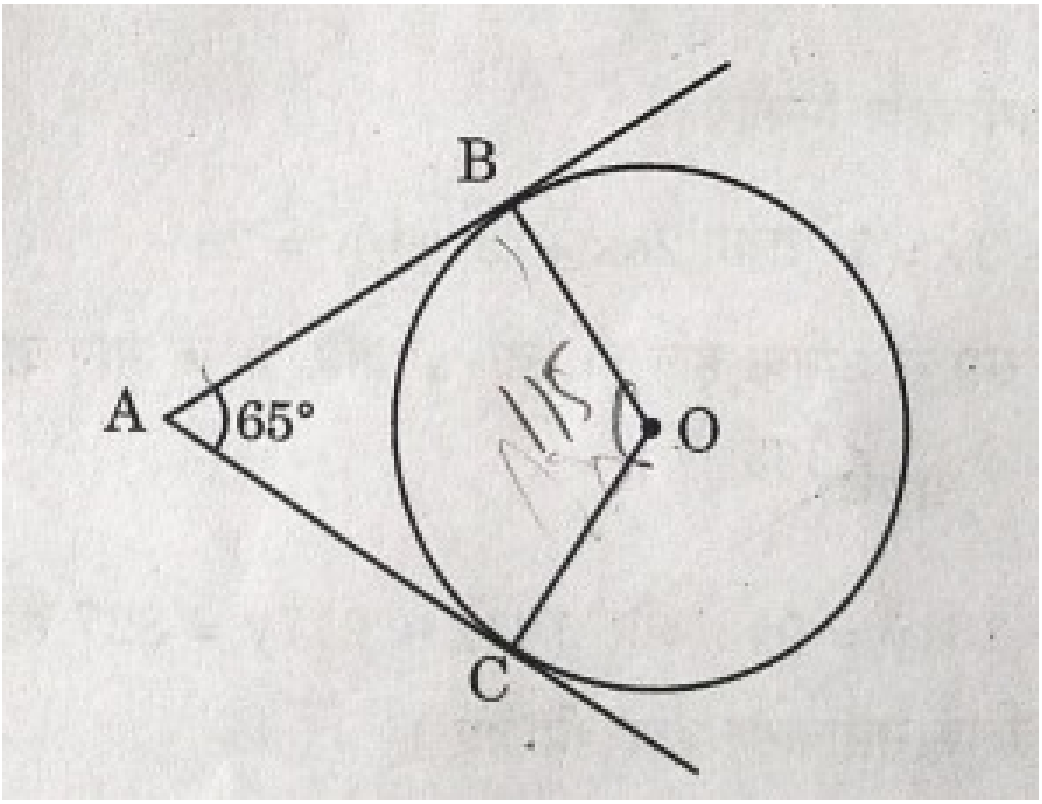

Figure 1

9. Find by prime factorisation the LCM of the number 18180 and 7575. Also,find the HCF of the two numbers.

10. Three bells ring at intervals of $6, 12 and 18 minutes$. If all the three bells rang at $6 a.m.$, when will they ring together again ?

11. Prove that :

$$\left(\frac{1}{\cos\theta} - \cos\theta\right)\left(\frac{1}{\sin\theta} - \sin\theta\right) = \frac{1}{\tan\theta + \cot\theta} \tag{1}$$

12. If $Q(0, 1)$ is equidistant from $P(5, -3)$ and $R(x, 6)$,find the values of x.

13. A car has two wipers which do not overlap. Each wiper has a blade of length 21cm sweeping through an angle of 120°. Find the total area cleaned

at each sweep of the two blades.

14. If the system of linear equations

$$2x + 3y = 7 and \quad (2)$$
$$2ax + (a + b)\, y = 28 \quad (3)$$

have infinite number of solutions, then find the values of $'a'$and$'b'$.

15. If

$$217x + 131y = 913 and \quad (4)$$
$$131x + 217y = 827, \quad (5)$$

then solve the equations for the values of x and y.

16. In the given figure, O is the centre of the circle and QPR is a tangent to it at P.Prove that $\angle QAP + \angle APR = 90°$.

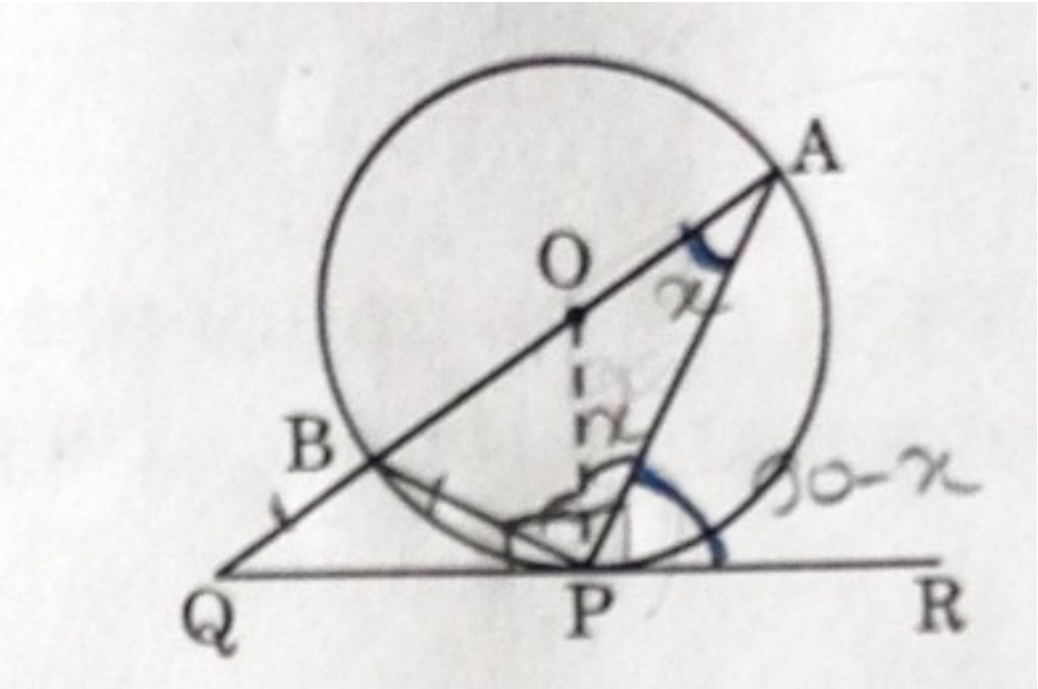

Figure 2

17. How many terms of the arithmetic progression 45, 39, 33, ... must be taken so that their sum is 180? Explain the double answer.

18. As observed from the top of a 75m high lighthouse from the sea-level, the angles of depression of two ships are 30° and 60°. If one ship is exactly behind the other on the same side of the lighthouse, find the distance between the two ships.
$\left(Use\ \sqrt{3} = 1.73\right)$

19. From a point on the ground, the angle of elevation of the bottom and top of a transmission tower fixed at the top of 30m high building are 30° and 60°, respectively. Find the height of the transmission tower. $\left(Use\ \sqrt{3} = 1.73\right)$.

20. A student noted the number of cars passing through a spot on a road for 100 periods each of 3 minutes and summarised it in the table given below. Find the mean and median of the following data.

Number of cars	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80
Frequency (Periods)	7	14	13	12	20	11	15	8

21. Sides AB and BC and median AD of a triangle ABC are respectively proportional to sides PQ and QR and median PM of $\triangle PQR$.Show that $\triangle ABC \sim \triangle PQR$.

22. Through the mid-point M of the side CD of a parallelogram $ABCD$,the line BM is drawn intersecting AC in L and AD (produced) in E.Prove that $EL = 2BL$.

23. In an annual day function of a school, the organizers wanted to give a cash prize along with a memento to their best students.Each memento is made as shown in the figure and its base $ABCD$ is shown from the front side.The rate of silver plating ₹ 20 percm^2.

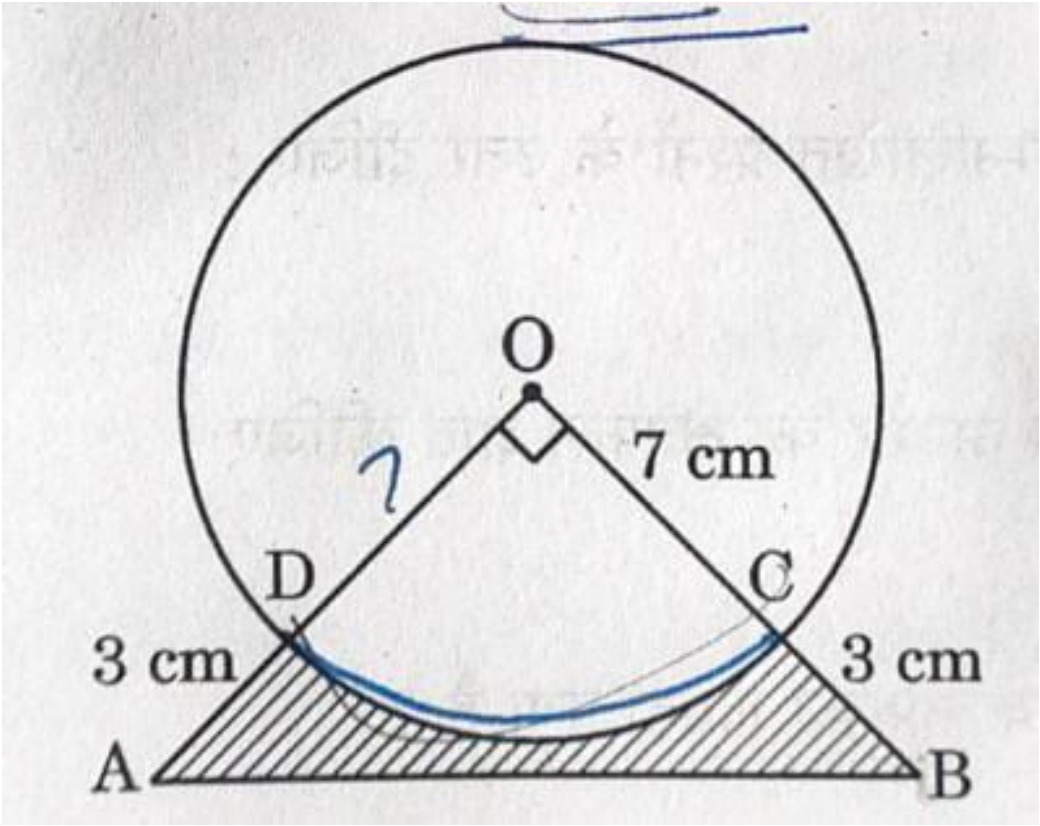

Figure 3

Based on the above, answer the following question:

(a) What is the area of the quadrant $ODOC$?

(b) Find the area of $\triangle AOB$.

(c) i. What is the total cost of silver plating the shaded part $ABCD$?

ii. What is the length of arc CD ?

24. In a coffee shop, coffee is served in two types of cups.One is cylindrical in shape with diameter 7cm and height 14cm and the other is hemispherical with diameter 21cm.

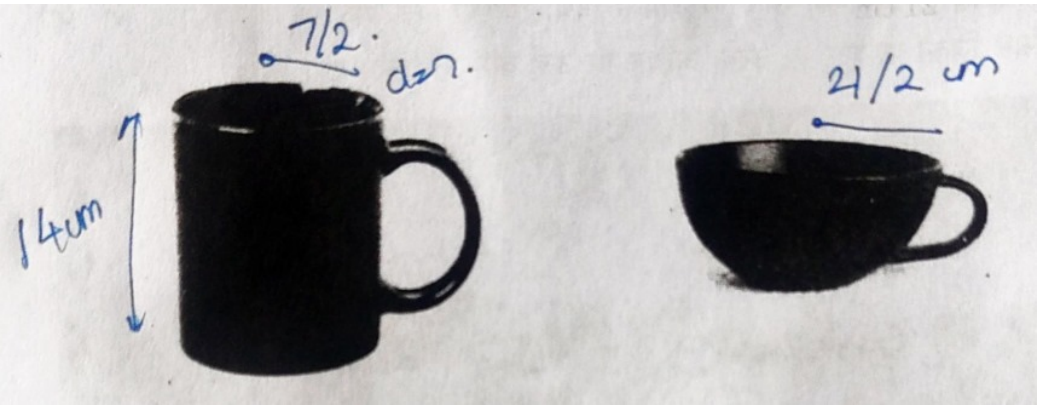

Figure 4

Based on the above, answer the following question:

(a) Find the area of the cylindrical cup.

(b) i. What is the capacity of the hemispherical cup?

ii. Find the capacity of the cylindrical cup.

(c) What is the curved surface area of the cylindrical cup?

25. Computer-based learning (CBL) refers to any teaching methodology that makes use of computers for information transmission. At an elementary school level, computer applications can be used to display multimedia lesson plans. A survey was done on 1000 elementary and secondary schools of Assam and they were classified by the number of computers they had.

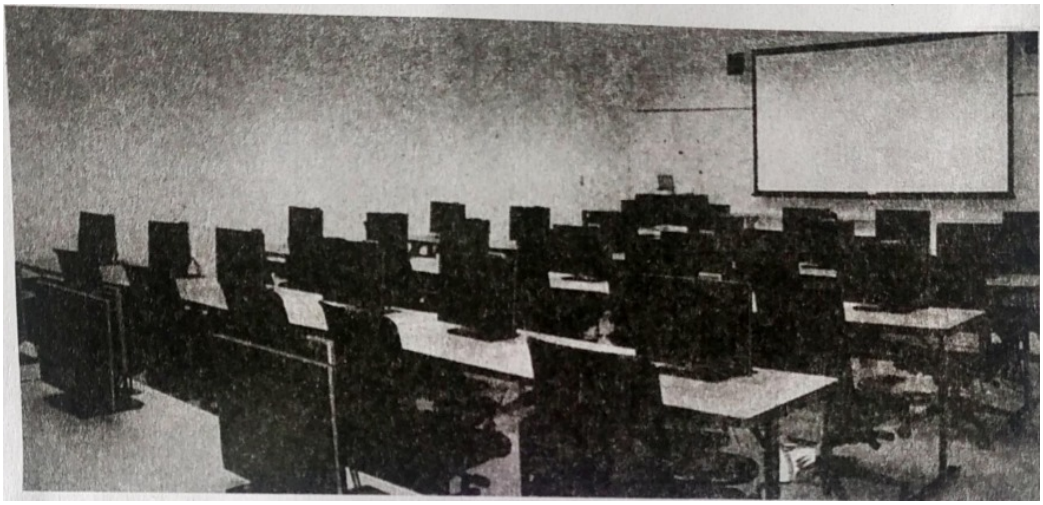

Figure 5

Number of computers	1-10	11-20	21-50	51-100	101 and more
Number of Schools	250	200	290	180	80

One school is chosen at random.Then:

(a) Find the probability that the school chosen at random has more than 100 computers.

(b) i. Find the probability that the school chosen at random has 50 or fewer computers.

ii. Find the probability that the school chosen at random has no more than 20 computers.

(c) Find the probability that the school chosen at random has 10 or less than 10 computers.