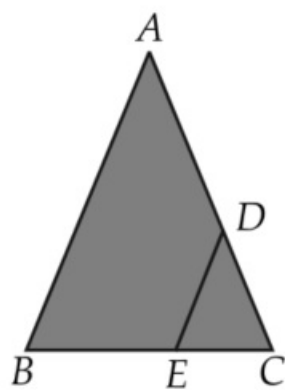


Question numbers 11 to 20 carry 1 mark each.

11. Find a rational number between $\sqrt{2}$ and $\sqrt{3}$.

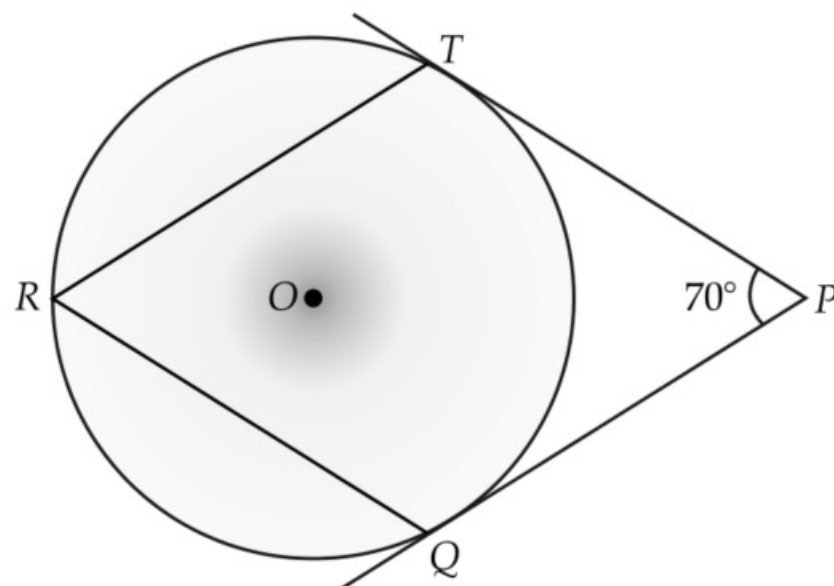
12. Two positive integers a and b can be written as $a = x^3y^2$ and $b = xy^3$, x, y are prime number. Find LCM (a, b).

AI 13.



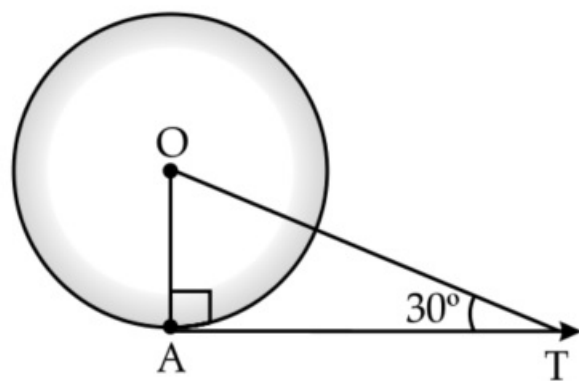
In the figure of ΔABC , the points D and E are on the sides CA, CB respectively such that $DE \parallel AB$, $AD = 2x$, $DC = x + 3$, $BE = 2x - 1$ and $CE = x$. Then, find x .

14. In figure, O is the centre of a circle. PT and PQ are tangents to the circle from an external point P . If $\angle TPQ = 70^\circ$, find $\angle TRQ$.



OR

In given figure, if AT is a tangent to the circle with centre O , such that $OT = 4$ cm and $\angle OTA = 30^\circ$, then find the length of AT (in cm).



15. Evaluate : $\sin^2 60^\circ + 2 \tan 45^\circ - \cos^2 30^\circ$.

OR

If $\sin A = \frac{3}{4}$, calculate $\sec A$.

16. Find the area (in cm^2) of the circle that can be inscribed in a square of side 8 cm.

17. The curved surface area of a cylinder is 264 m^2 and its volume is 924 m^3 . Find the ratio of its height to its diameter.

18. If the distance between the points $(4, k)$ and $(1, 0)$ is 5, then what can be the possible values of k ?

OR

Write the co-ordinates of a point P on x -axis which is equidistant from the points $A(-2, 0)$ and $B(6, 0)$.

19. For the following distribution :

Class	0 - 5	5 - 10	10 - 15	15 - 20	20 - 25
Frequency	10	15	12	20	9

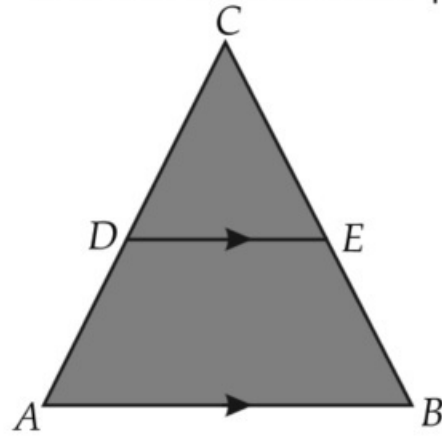
Find the sum of lower limits of median class and modal class.

20. A number is chosen at random from the numbers $-3, -2, -1, 0, 1, 2, 3$. What will be the probability that square of this number is less than or equal to 1.

Section 'B'

Question numbers 21 to 26 carry 2 marks each.

21. Write the denominator of the rational number $\frac{257}{500}$ in the form $2^m \times 5^n$, where m and n are non-negative integers. Hence write its decimal expansion without actual division.
22. In the given figure, $\angle A = \angle B$ and $AD = BE$. Show that $DE \parallel AB$.



OR

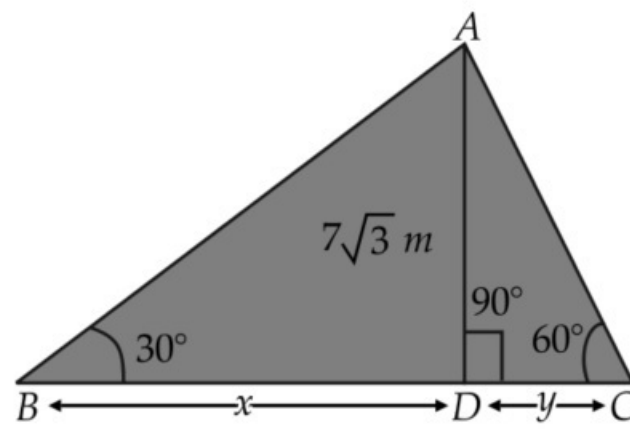
In a rectangle $ABCD$, E is a point on AB such that $AE = \frac{2}{3} AB$. If $AB = 6$ km and $AD = 3$ km, then find DE .

23. If $\sin(A + B) = 1$ and $\sin(A - B) = \frac{1}{2}$, $0 \leq A + B = 90^\circ$ and $A > B$, then find A and B .

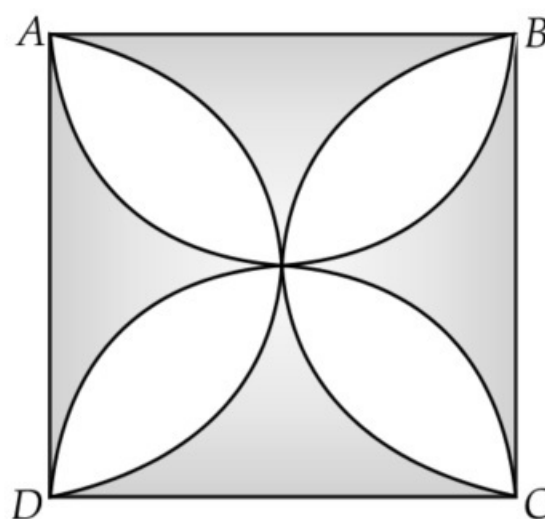
24. An observer 1.5 m tall is 28.5 m away from a tower 30 m high. Find the angle of elevation of the top of the tower from his eye.

OR

In the given figure, if $AD = 7\sqrt{3}$ m, then find the value of BC .



25. In Fig., $ABCD$ is a square of side 14 cm. Semi-circles are drawn with each side of square as diameter. Find the area of the shaded region. (Use $\pi = \frac{22}{7}$)



Section 'C'

Question numbers 27 to 34 carry 3 marks each.

27. The larger of two supplementary angles exceeds the smaller by 18° . Find the angles.

OR

A father's age in three times the sum of the ages of his two children. After 5 years his age will be two times the sum of their ages. Find the present age of the father.

28. If one of the zeroes of a polynomial $3x^2 - 8x + 2k + 1$ is seven times the other, find the value of k .
29. The ratio of the sums of first m and first n terms of an A.P. is $m^2 : n^2$. Show that the ratio of its m^{th} and n^{th} terms is $(2m - 1) : (2n - 1)$.

OR

AI If the p^{th} term of an A.P. is $\frac{1}{q}$ and q^{th} term is $\frac{1}{p}$. Prove that the sum of first pq term of the A.P. is

$$\left[\frac{pq+1}{2} \right].$$

30. One fourth of a herd of camels was seen in forest. Twice of square root of the herd had gone to mountains and remaining 15 camels were seen on the bank of a river, find the total number of camels.
31. A vertical row of trees 12 m long casts a shadow 8 m long on the ground, At the same time a tower casts the shadow 40 m long on the ground.
(i) Determine the height of the tower.
(ii) Which mathematical concept is used in this problem ?
32. Prove that opposite sides of a quadrilateral circumscribing a circle subtend supplementary angles at the centre of the circle.
33. Prove that : $\frac{\tan \theta}{1 - \cot \theta} + \frac{\cot \theta}{1 - \tan \theta} = 1 + \tan \theta + \cot \theta$.
34. A bag contains 18 balls out of which x balls are red.
(i) If one ball is drawn at random from the bag, what is the probability that it is not red ?
(ii) If 2 more red balls are put in the bag, the probability of drawing a red ball will be $\frac{9}{8}$ times the probability of drawing a red ball in the first case. Find the value of x .

OR

Cards numbered 1 to 30 are put in a bag. A card is drawn at random. Find the probability that the drawn card is

- (i) prime number > 7
(ii) not a perfect square.

Section 'D'

Question numbers 35 to 40 carry 4 marks each.

35. Solve for x : $\frac{x-1}{2x+1} + \frac{2x+1}{x-1} = 2$, where $x \neq \frac{-1}{2}, 1$

OR

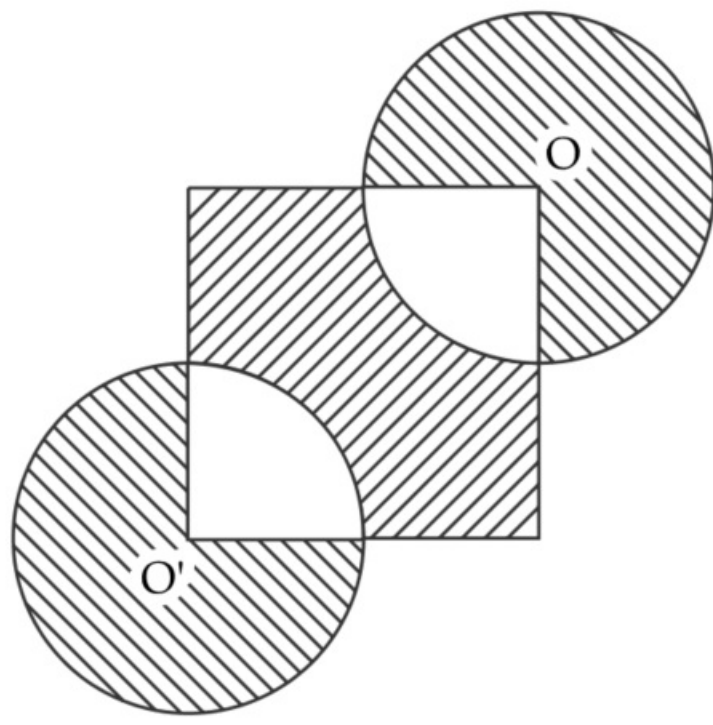
A dealer sells a toy for ₹ 24 and gains as much percent as the cost price of the toy.

- (i) Find the cost price of the toy.
(ii) Which mathematical concept is used in the above problem ?
36. Show that $\triangle ABC$, where $A(-2, 0)$, $B(2, 0)$, $C(0, 2)$ and $\triangle PQR$ where $P(-4, 0)$, $Q(4, 0)$, $R(0, 4)$ are similar triangles.
37. Construct a $\triangle ABC$ in which $CA = 6$ cm, $AB = 5$ cm and $\angle BAC = 45^\circ$. Then construct a triangle whose sides are $\frac{3}{5}$ of the corresponding sides of $\triangle ABC$.

OR

Construct a $\triangle ABC$ in which $AB = 4$ cm, $BC = 5$ cm and $AC = 6$ cm. Then construct another triangle whose sides are $\frac{2}{3}$ times the corresponding sides of $\triangle ABC$.

38. A moving boat is observed from the top of a 150 m high cliff, moving away from the cliff. The angle of depression of the boat changes from 60° to 45° in 2 minutes. Find the speed of the boat.
39. In the given figure, the side of square is 28 cm and radius of each circle is half of the length of the side of the square, where O and O' are centres of the circle. Find the area of shaded area.



OR

A solid is in the form of a cylinder with hemispherical ends. The total height of the solid is 20 cm and the diameter of the cylinder is 7 cm. Find the total volume of the solid (use $\pi = \frac{22}{7}$)

40. In annual day of a school, age-wise participation of students is shown in the following frequency distribution :

Age of student (in years)	5-7	7-9	9-11	11-13	13-15	15-17	17-19
Number of students	20	18	22	25	20	15	10

Draw a 'less than type' ogive for the above data and from it find the median age.

