

10. If the sum of the circumferences of two circles with radii R_1 and R_2 is equal to the circumference of a circle of radius R , then :
- (a) $R_1 + R_2 = R$
 - (b) $R_1 + R_2 > R$
 - (c) $R_1 + R_2 < R$
 - (d) Nothing definite can be said about the relation among R_1, R_2 and R

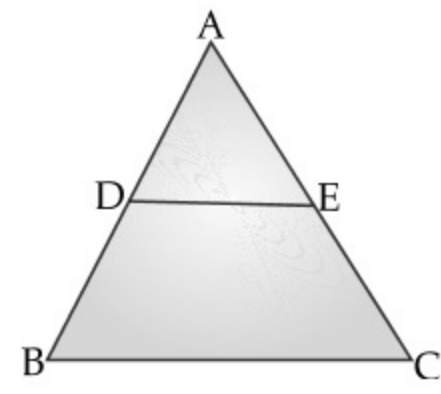
(11-15) Fill in the blanks.

11. The smallest positive rational number by which $\frac{1}{7}$ should be multiplied so that its decimal expansion terminates after 2 places of decimal is

[AI] 12. The denominator of rational number $\frac{257}{5000}$ in the form of $2^m \times 5^n$, where m, n are non-negative integers is

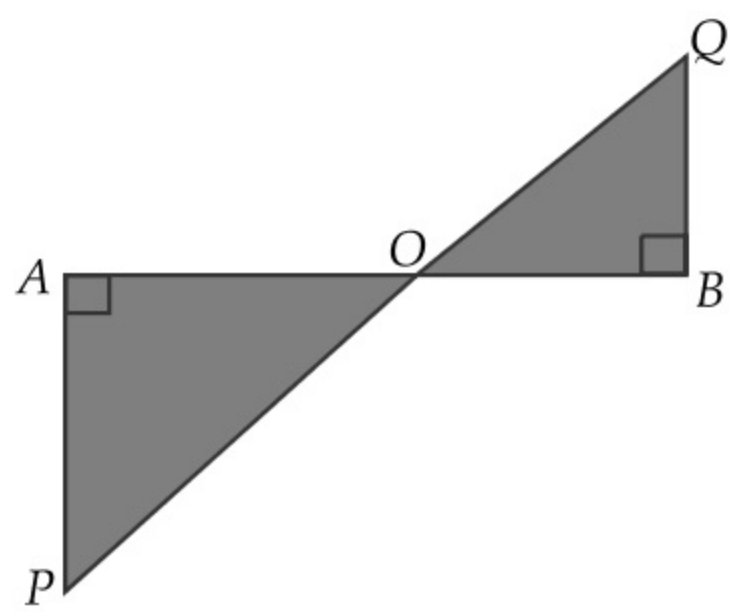
13. The coordinates of the point on y-axis which is nearest to the point $(-2, 5)$ is

14. In Figure, $DE \parallel BC, AD = 1$ cm and $BD = 2$ cm. The ratio of the ar (ΔABC) to the ar (ΔADE) is

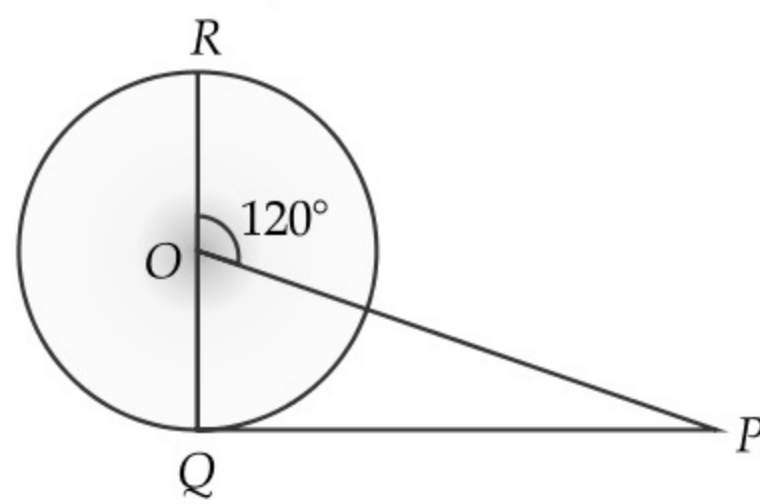


OR

In the given figure, if $\angle A = 90^\circ, \angle B = 90^\circ, OB = 4.5$ cm, $OA = 6$ cm and $AP = 4$ cm, then QB



15. PQ is a tangent drawn from an external point P to a circle with centre O and QOR is the diameter of the circle. If $\angle POR = 120^\circ$, the measure of $\angle OPQ$ is



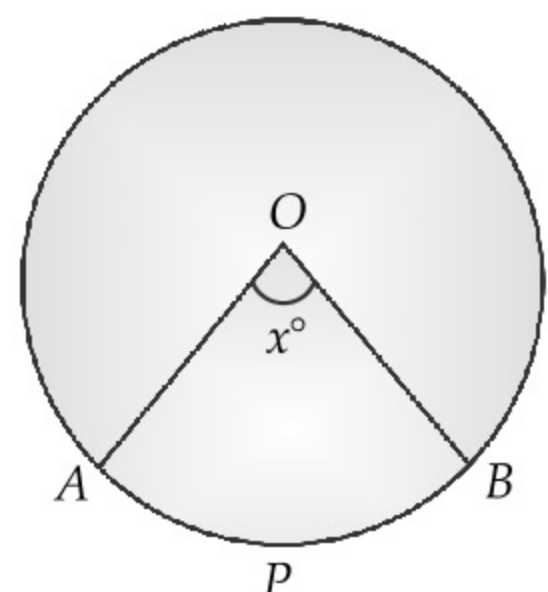
(16-20) Answer the following

16. Find the value of $\sin^2 33^\circ + \sin^2 57^\circ$.

OR

[AI] If $k + 1 = \sec^2 \theta (1 + \sin \theta) (1 - \sin \theta)$, then find the value of k .

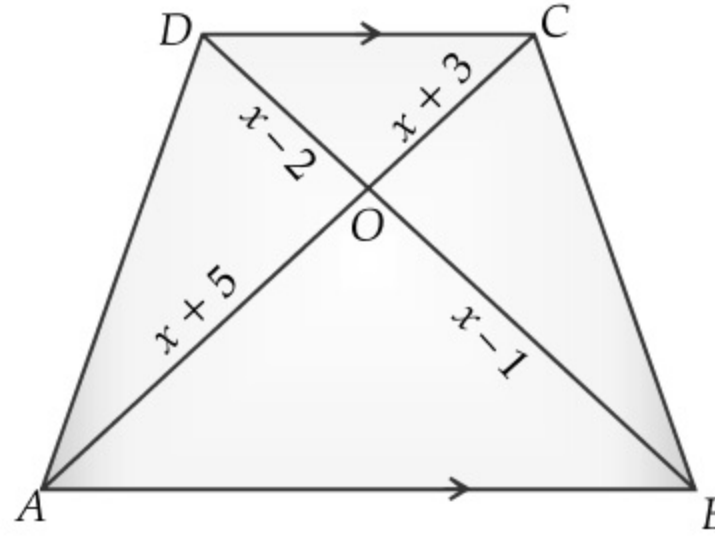
17. In given fig., O is the centre of a circle. If the area of the sector $OAPB$ is $\frac{5}{36}$ times the area of the circle, then find the value of x .



18. If the areas of three adjacent faces of a cuboid are X , Y , and Z respectively, then find the volume of cuboid.
19. From the following frequency distribution, find the median class :
- | | | | | |
|-----------------------------|-------------|-------------|-------------|-------------|
| Cost of living index | 1400 – 1550 | 1550 – 1700 | 1700 – 1850 | 1850 – 2000 |
| Number of weeks | 8 | 15 | 21 | 8 |
20. Out of 200 bulbs in a box, 12 bulbs are defective. One bulb is taken out at random from the box. What is the probability that the drawn bulb is not defective ?

Section 'B'

21. Three sets of English, Hindi and Sociology books dealing with cleanliness have to be stacked in such a way that all the books are stored topicwise and the height of each stack is the same. The number of English books is 96, the number of Hindi books is 240 and the number of sociology books is 336.
- (i) Assuming that the books are of the same thickness, determine the number of stacks of English, Hindi and Sociology books.
- (ii) Which mathematical concept is used in the problem?
22. In the given figure, if $AB \parallel DC$, find the value of x .



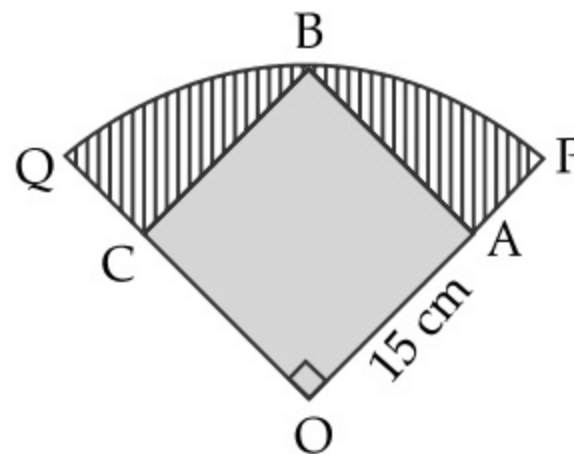
23. Evaluate :

$$\left(\frac{3 \sin 43^\circ}{\cos 47^\circ} \right)^2 - \frac{\cos 37^\circ \operatorname{cosec} 53^\circ}{\tan 5^\circ \tan 25^\circ \tan 45^\circ \tan 65^\circ \tan 85^\circ}$$

OR

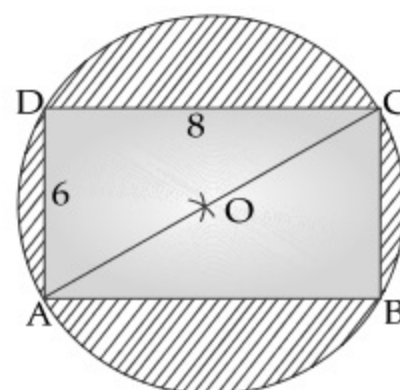
Prove that : $(\sin \theta + \operatorname{cosec} \theta)^2 + (\cos \theta + \sec \theta)^2 = 7 + \tan^2 \theta + \cot^2 \theta$

24. Manu is 1.7 m tall, he wants to see the light tower near his house and measure its height. The distance of tower from his house is $20\sqrt{3}$ m. So he used the concept of trigonometry. The angle of elevation from the eye of Manu to the top of tower is 30° . Find the height of the tower.
25. In Figure, a square $OABC$ is inscribed in a quadrant $OPBQ$. If $OA = 15$ cm, find the area of the shaded region. (Use $\pi = 3.14$)



OR

Find the area of the shaded region in Figure, if $ABCD$ is a rectangle with sides 8 cm and 6 cm and O is the centre of circle. (Take $\pi = 3.14$)



26. Find the mode of the following frequency distribution

Class Interval	25 - 30	30 - 35	35 - 40	40 - 45	45 - 50	50 - 55
Frequency	25	34	50	42	38	14

Section 'C'

27. If α , β and γ are zeroes of the polynomial $6x^3 + 3x^2 - 5x + 1$, then find the value of $\alpha^{-1} + \beta^{-1} + \gamma^{-1}$

OR

For what value of k , if the polynomial

$f(x) = 3x^4 - 9x^3 + x^2 + 15x + k$ is completely divisible by $3x^2 - 5$

28. Find c if the system of equations $cx + 3y + (3 - c) = 0$; $12x + cy - c = 0$ has infinitely many solutions ?

OR

Find the value(s) of k so that the pair of equations $x + 2y = 5$ and $3x + ky + 15 = 0$ has a unique solution.

29. Rinku and his family were going in summer vacation to a hill station. They decide to travel in a train. The train was running late by its expected time. The train covers a distance of 300 km at a uniform speed. If the speed of the train is increased by 5 km/hour, it takes 2 hour less in journey. Find the original speed of the train.

- [AI]** 30. If the sum of first four terms of an AP is 40 and that of first 14 terms is 280. Find the sum of its first n terms.

OR

If the 10th term of an A.P. is 52 and the 17th term is 20 more than the 13th term, find the A.P.

31. Two right triangles ABC and DBC are drawn on the same hypotenuse BC and on the same side of BC . If AC and BD intersect at P , prove that $AP \times PC = BP \times DP$.

32. Prove that :

$$\frac{\tan \theta}{1 - \cot \theta} + \frac{\cot \theta}{1 - \tan \theta} = 1 + \sec \theta \operatorname{cosec} \theta$$

33. Prove that the tangents drawn at the ends of a diameter of a circle are parallel.

34. Peter and Rina were playing the game. Peter throws two different dice together and finds the product of the two numbers obtained. Rina throws a die and find a square of a number. Who has the better chance to get the numbers 25.

Section 'D'

35. A boat goes 30 km upstream and 44 km downstream in 10 hours. In 13 hours, it can go 40 km upstream and 55 km downstream. Determine the speed of the stream and that of the boat in still water.

OR

If the roots of the quadratic equation $(c^2 - ab)x^2 - 2(a^2 - bc)x + b^2 - ac = 0$ in x are equal, then show that either $a = 0$ or $a^3 + b^3 + c^3 = 3abc$

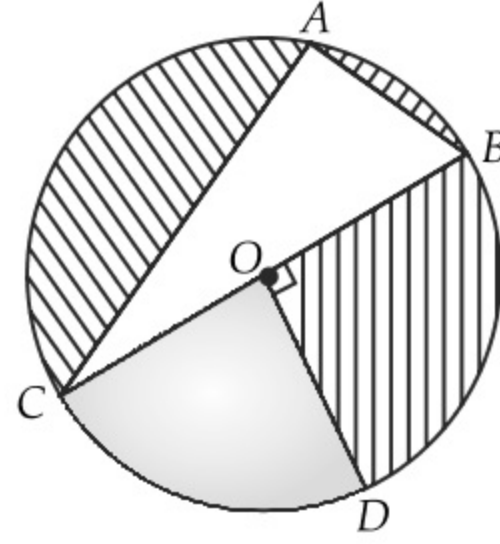
36. Find the ratio in which the line $x - 3y = 0$ divides the line segment joining the points $(-2, -5)$ and $(6, 3)$. Find the coordinates of the point of intersection.

OR

Find the ratio in which the segment joining the points $(1, -3)$ and $(4, 5)$ is divided by x -axis ? Also find the coordinates of this point on x -axis.

37. Construct a ΔABC in which $BC = 6$ cm, $\angle B = 45^\circ$ cm and $\angle A = 105^\circ$. Then construct another triangle whose sides are $\frac{3}{5}$ times of the corresponding sides of ΔABC .

38. Two poles of equal heights are standing opposite each other on either side of the road, which is 80 m wide. From a point between them on the road, the angles of elevation of the top of the poles are 60° and 30° respectively. Find the height of the poles and the distances of the point from the poles.
39. In the given figure, O is the centre of the circle with $AC = 24$ cm, $AB = 7$ cm and $\angle BOD = 90^\circ$. Find the area of the shaded region.



OR

A right cylindrical container of radius 6 cm and height 15 cm is full of ice-cream, which has to be distributed to 10 children in equal cones having hemispherical shape on the top. If the height of the conical portion is four times its base radius, find the radius of the ice-cream cone.

40. The marks obtained by 100 students of a class in an examination are given below:

Marks	0 - 5	5 - 10	10 - 15	15 - 20	20 - 25	25 - 30	30 - 35	35 - 40	40 - 45	45 - 50
No. of Students	2	5	6	8	10	25	20	18	4	2

Draw 'a less than' type cumulative frequency curves (ogive). Hence find median.