Class-X.

1. Using the empirical formula, find Mode of a distribution whose mean is 8.32 and the median is 8.05. Ans 7.51

2. What is the value of $\left(\frac{1}{1+\cot^2\theta} + \frac{1}{1+\tan^2\theta}\right)$. Ans. 1

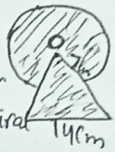
3. Find the 11th term from the last term of the A.P 12, 8, 4, ···, −84. Ans −44

4. If $\tan\theta = \sqrt{3}$, find the value of $\left(2\sec\theta / 1+\tan^2\theta\right)$. Ans 1

5. In what ratio does the point P(−4, y) divide the line segment joining the points A(−6, 10) and B(3, −8) if it lies on AB. Hence find y. Ans 2:7, y = 6

6. Find the ratio in which the line segment joining the points A(2, −2) and B(3, 7) is divided by the line $2x+y-4=0$. Ans 2:9

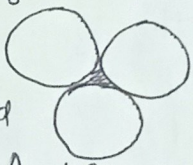
7. In figure, find the area of the shaded region where a circular arc of radius 7cm has been drawn with vertex O of an equilateral triangle OAB of side 14cm as centre ($\pi = \frac{22}{7}$, $\sqrt{3} = 1.73$). Ans 213.11 cm^2



8. Find the greatest 5 digit number which is exactly divisible by 12, 18 and 24 → Ans 99936

9. Find c, if the system of equations $cx+3y+(3-c)=0$; $12x+cy-c=0$ has infinitely many solutions. Ans c = 6

10. In figure, three circles each of radius 3.5cm are drawn in such a way that each of them touches the other two. Find the area enclosed between these three circles (shaded regions). Ans 1.94 cm^2



11. A moving boat is observed from the top of a 150m 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 boat in m/min. Ans 31.7 m/min

12. There are two pols, one each on either bank of a river just opposite to each other. One pole is 60m high. From top of this pole, the angle of depression of the top and foot of the other pole are 30° and 60° respectively. Find the width of the river and height of the other pole. Ans h = 40m, $20\sqrt{3}$ m.

13. Two cubes have their volumes in the ratio 1:27. Find the ratio of their surface area. Ans. 1:9

14. Volume and surface area of a solid hemisphere are numerically equal. What is the diameter of hemisphere? Ans. 9cm.

15. If α, β are zeros of the polynomial $P(x) = x^2 - 3ax + a^2$, then the value of a if it is given that $\alpha^2 + \beta^2 = \frac{7}{4}$. Ans $\pm \frac{1}{2}$

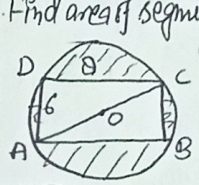
16. If the roots of the equation $(a-b)x^2 + (b-c)x + (c-a) = 0$ are equal then Prove that $2a = b + c$

17. If $\tan\theta = 1$ and $\sin\phi = \frac{1}{\sqrt{2}}$, find the value of $\cos(\theta + \phi)$, where θ and ϕ are both acute angles. Ans. 0

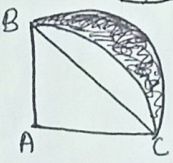
18. The minute hand of a clock is 12cm long. Find the area of the face of the clock described by the minute hand in 35 min. Ans $264\ cm^2$

19. A chord 10cm long is drawn in a circle whose radius is $\sqrt{50}$ cm. Find area of segment. Ans $14.28\ cm^2$

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



21. In the given figure, BOC is a quadrant of a circle of radius 14cm. and a semi-circle is drawn with BC as diameter. Find the area of shaded region. Ans $98\ cm^2$



22. From a solid cube of side 7cm., a conical cavity of height 7cm and radius 3cm. is hollowed out. Find the volume of the remaining solid. Ans $277\ cm^3$

23. Find the probability that a number selected at random from the numbers 3, 4, 4, 4, 5, 5, 6, 6, 6, 7 will be their mean. Ans $\frac{1}{5}$

24. A number x is chosen at random from the numbers $-4, -3, -2, -1, 0, 1, 2, 3, 4$. What is the probability that $|x| < 2$?