MM 90　　　**Mathematics Mock Test Class X, 2015 SA2**　　**Time 3 hours**
Paper by Dev Anoop (Bathinda)

Section A - 1 Mark Each

1.　Find the distance of the point P (2, 3) from the *x*-axis.

2.　Find area of the largest triangle that can be inscribed in a semi-circle of radius *r* units.

3.　If the common difference of an AP is 2, then what is $a_{28} - a_{13}$ _____

4.　In figure, AT is a tangent to the circle with centre O such that OT = 4 cm and $\angle$OTA = 30°. Then find AT
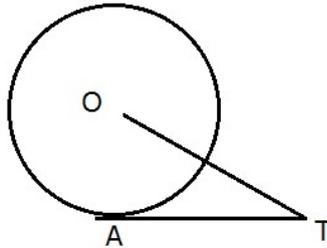
Section B - 2 Marks Each

5.　If 7 times the 7th term of an AP is equal to 11 times its 11th term, then find its 18th term.

6.　If *a*, *b*, *c* are the sides of a right triangle where *c* is the hypotenuse, prove that the radius *r* of the circle which touches the sides of the triangle is given by $\dfrac{a+b-c}{2}$

7　An observer 1.5 metres tall is 20.5 metres away from a tower 22 metres high. Determine the angle of elevation of the top of the tower from the eye of the observer.

8.　Is the following statement 'True' or 'False'? Justify your answer. If in a quadratic equation the coefficient of *x* is zero, then the quadratic equation has no real roots.

9.　If you toss a coin 6 times and it comes down heads on each occasion. Can you say that the probability of getting a head is 1? Give reasons.

10　The angles of elevation of the top of a tower from two points at a distance of 4 m and 9 m from the base of the tower and in the same straight line with it are complementary. Prove that the height of the tower is 6 m.
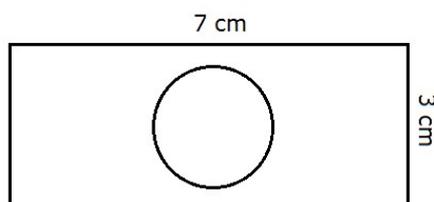
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Section C - 3 Marks Each

11. Find the sum of all the 11 terms of an AP whose middle most term is 30.

12. Suppose you drop a die at random on the rectangular region shown in figure. What is the probability that it will land inside the circle with diameter 1m?

13. A game consists of tossing a one rupee coin 3 times and noting its outcome each time. Anubhav wins if all the tosses give the same result i.e., three heads or three tails, and loses otherwise. Calculate the probability that Anubhav will lose the game.

14. Find k for real roots, $4x^2 - kx + 4 = 0$.

15. Given a regular hexagon, find area of shaded region.
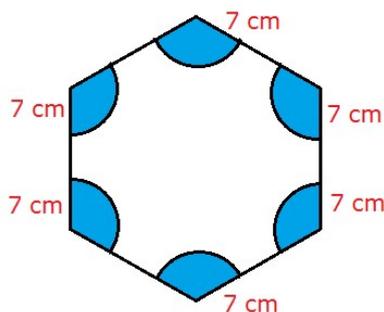
16. Construct an isosceles triangle whose base is 8 cm and altitude 4 cm and then another triangle whose sides are $1\frac{2}{3}$ times the corresponding sides of the isosceles triangle.

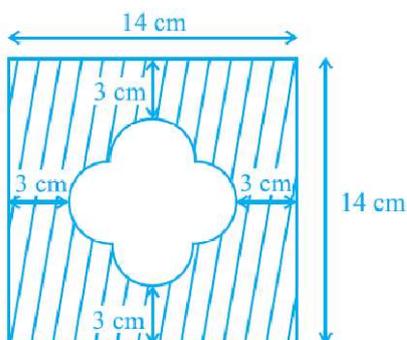17. The lengths of tangents drawn from an external point to a circle are equal. Prove.

18. Name the type of quadrilateral formed, if any, by the following points, and give reasons for your answer: (−3, 5), (3, 1), (0, 3), (−1, − 4) 20 If A and B are (− 2, − 2) and (2, − 4), respectively,

19. find the coordinates of P such that AP $= \dfrac{3}{7}$ AB and P lies on the line segment AB.

20. Find the area of the shaded region given in Fig.

Section D - 4 Marks Each

21. 200 logs are stacked in the following manner: 20 logs in the bottom row, 19 in the next row, 18 in the row next to it and so on. In how many rows are the 200 logs placed and how many logs are in the top row?

22. At present Sham's age (in years) is 2 more than the square of his son Ravi's age. When Ravi grows to his father's present age, Sham's age would be one year less than 10 times the present age of Ravi. Find the present ages of both Sham and Ravi.

23. A train travels a distance of 480 km at a uniform speed. If the speed had been 8 km/h less, then it would have taken 3 hours more to cover the same distance. Find the speed of the train.

24. The rain water from a roof of dimensions 22 m 20 m drains into a cylindrical vessel having diameter of base 2 m and height 3.5 m. If the rain water collected from the roof just fill the cylindrical vessel, then find the rainfall in cm.

25.   The height of a cone is 30cm . a small cone is cut off at the top by a plane parallel to the base. If its volume be $\frac{1}{27}$ of the volume of the given cone, at what height above the base is the section made?

OR

A right triangle, whose sides are 3 cm and 4 cm (other than hypotenuse) is made to revolve about its hypotenuse. Find the volume and surface area of the double cone so formed. (Choose value of π as found appropriate.)

26.   PQ is a chord of length 8 cm of a circle of radius 5 cm. The tangents at P and Q intersect at a point T . Find the length TP.
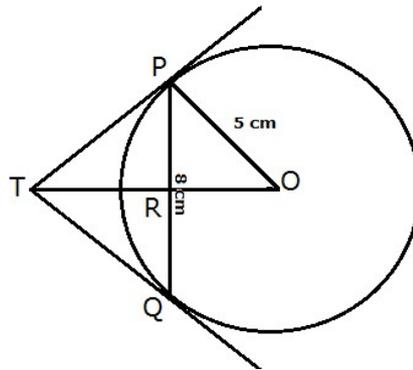
27   A cylindrical bucket of height 32 cm and base radius 18 cm is filled with sand. This bucket is emptied on the ground and a conical heap of sand is formed. If the height of the conical heap is 24 cm, find the radius and slant height of the heap.

28.   Find the area of the triangle ABC with A (1, −4) and the mid-points of sides through A being (2, − 1) and (0, − 1).
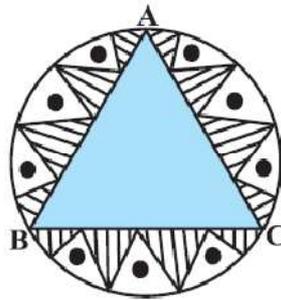
29.   Let ABC be a right triangle in which AB = 6 cm, BC = 8 cm and □ B = 90°. BD is the perpendicular from B on AC. The circle through B, C, D is drawn. Construct the tangents from A to this circle. 27In a circular table cover of radius 32 cm, a design is formed leaving an equilateral triangle ABC in the middle as shown in figure Find the area of the shaded region.

30.   The angle of elevation of a cloud from a point h metres above the surface of a lake is θ and the angle of depression of its reflection in the lake is φ. Prove that the height of the cloud above the lake is $h\dfrac{\tan\phi + \tan\theta}{\tan\phi - \tan\theta}$

31.   A building is in the form of a cylinder surmounted by a hemispherical dome. The base diameter of the dome is equal to $\dfrac{2}{3}$ of the total height of the building. Find the height of the building, if it contains $67\dfrac{1}{21}$ m3 of air.