CBSE Class – X
A Step towards Board Exam 2020
Mock Test
Subject: Mathematics

Time: 180 Mints. **M.M.: 80**

SECTION – A
(Question Number 1 to 20 – 1 Mark each) [1 x 20 = 20]
[Question Number 1 to 10: Multiple Choice Questions]

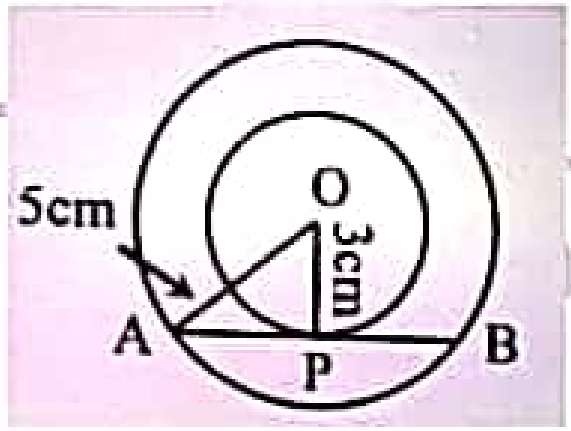
1. If $\tan \theta = 4/3$, then $(\sin \theta + \cos \theta) = ?$

   (A) 7/3 (B) 7/4 (C) 7/5 (D) 5/7

2. The string of a kite is 100 m long and it makes an angle of 600 with the horizontal. If there is no slack in the string, the height of the kite from the ground is –

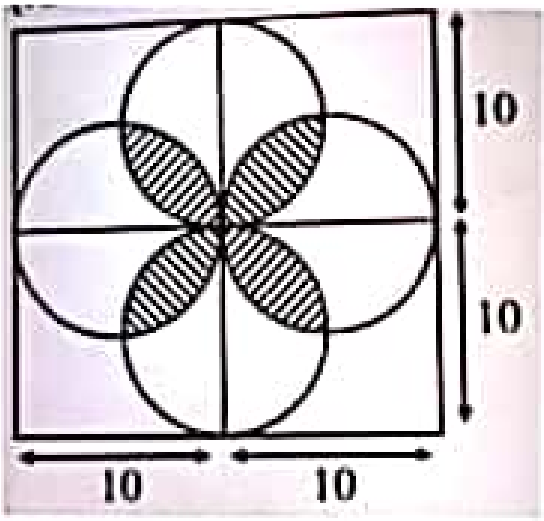
   (A) $50\sqrt{3}$ m (B) $100\sqrt{3}$ m (C) $50\sqrt{2}$ m (D) 100 m

3. Two concentric circles are of radii 5 cm and 3 cm. Find the length of the chord of a larger circle which touches the smaller circle as given in the below figure –



   (A) 6 cm (B) 9 cm (C) 8 cm (D) 2 cm

4. Find the area of the shaded region. All the circles shown in the below figure are congruent –



(A) 25 (0.5 π – 1) sq. units (B) 50 π sq. units

(C) 100 (0.5 π – 1) sq. units (D) 200 (π – 1) sq. units

5. The radius of the base of a cone is 5 cm and its height is 12 cm. Its curved surface area is –

(A) 60 π cm² (B) 65 π cm² (C) 30 π cm² (D) None of these

6. The algebraic sum of the deviations of a frequency distribution from its mean is –

(A) Zero (B) Always positive

(C) Always negative (D) A non-zero number

7. The median of 5, 11, 12, x, 18 and 29 is 14. If the observations are in ascending order, then x =

(A) 14 (B) 15 (C) 15.5 (D) 16

8. The curve 'less than ogive' is always:

(A) Ascending (B) Descending

(C) Sometimes ascending and sometimes descending (D) None of these

9. What is the probability of an impossible event?

(A) 1/2 (B) 0 (C) 1 (D) None of these

10. Three coins are tossed simultaneously. What is the probability of getting at most 2 heads?

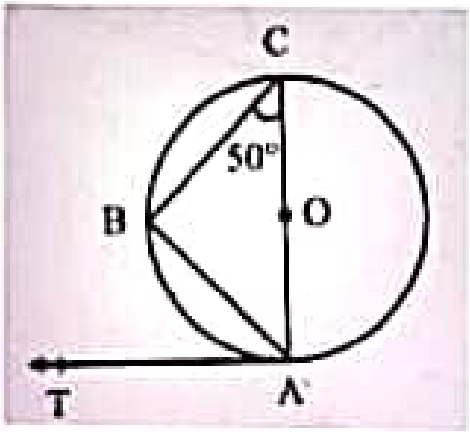
(A) 2/3 (B) 3/4 (C) 5/8 (D) 7/8

Q11 – Q15:Fill in the Blanks:

11. tan 1° tan 2° tan 3°..... tan 89° = ...
12. The number of tangents that can be drawn to a circle from a point inside the circle are .....
13. The perimeter of a sector of a circle of radius 5.2 cm, is 16.4 cm. The area of the sector is.....
14. If mean = 30, median = 80 then mode will be .....
15. If an event cannot occur then its probability is .....

Q16 – Q20: Answer the following

16. A pole 6 m high casts a shadow $2\sqrt{3}$ m long on the ground. At this instant, what will be sun's elevation?
17. AB is a chord of the circle and AOC is its diameter such that angle ACB = 50° (as shown in below figure). If AT is the tangent to the circle at the point A, then what will be the angle BAT?



18. If a circle of radius 7 cm is divided into 10 equal parts, then what will be the area of each sector?

19. How many lead balls, each of radius 1 cm, can be made from a sphere of radius 8 cm?

20. The mean of 13 observations is 8. One observation equal to 20 is dropped. What will be the new mean?

SECTION – B

Short Answer Type Questions - I (2 Marks Each)

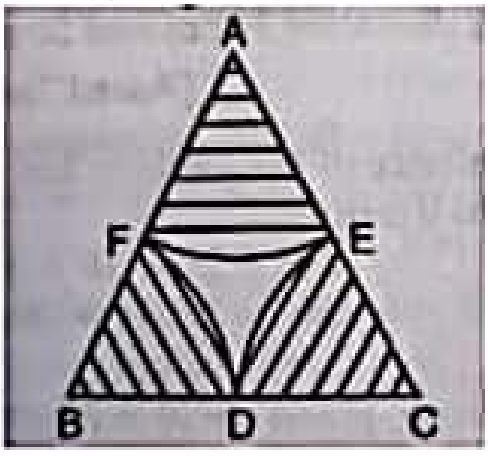
21. If $\tan(A + B) = \sqrt{3}$, $\tan(A - B) = 1/\sqrt{3}$, $0° < A + B \leq 90°$, $A > B$, then find A and B.

22. From a point P on the ground the angle of elevation of the top of a 10 m tall building is 30°. A flag is hoisted at the top of the building and the angle of elevation of the top of the flagstaff from P is 45°. Find the length of the flagstaff and the distance of building from point P. [Take $\sqrt{3} = 1.732$]

OR,

The angle of elevation of the top of a building from the foot of the tower is 30° and the angle of elevation of the top of the tower from the foot of the building is 45°. If the tower is 30 m high, find the height of the building.

23. In the given figure, arc are drawn by taking vertices A, B and C of an equilateral triangle of side 10 cm, to intersect the sides BC, CA and AB at their respective mid-points D, E and F. Find the area of the shaded region. (Use $\pi = 3.14$)



24. If the total surface area of a solid hemisphere is 462 cm^2, find its volume. (Take $\pi = 22/7$)

25. The data regarding marks obtained by 48 students of a class in a class test is given below. Calculate the modal marks of students.

Marks obtained	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50
Number of students	1	0	2	0	0	10	25	7	2	1

OR,

Calculate the median from the following data:

Marks obtained	0-10	10-20	20-30	30-40	40-50
Number of students	5	15	30	8	2

26. A bag contains 5 red, 8 green and 7 white balls. One ball is drawn at random from the bag, find the probability of getting:

(A) Not a white ball and

(B) Neither a green nor a red ball.

SECTION – C

Short Answer Type Questions - II (3 Marks Each)

27. Verify:

$$\sqrt{\frac{1 - Cos\theta}{1 + Cos\theta}} = \frac{Sin\theta}{1 + Cos\theta}, \text{ for } \theta = 60^\circ$$

28. Evaluate:

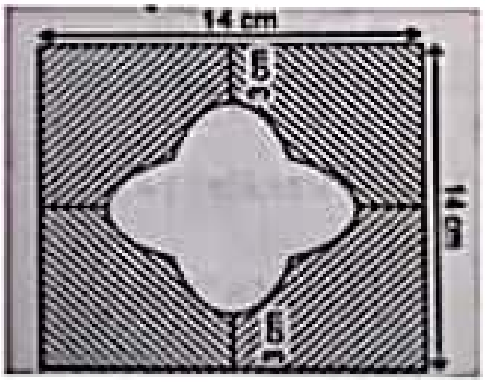
$$\frac{\sec 41^\circ \sin 49^\circ + \cos 29^\circ \operatorname{cosec} 61^\circ - \frac{2}{\sqrt{3}}(\tan 20^\circ \tan 60^\circ \tan 70^\circ)}{3(\sin^2 31^\circ + \sin^2 59^\circ)}$$

29. The angles of depression of the top and bottom of a 50 m high building from the top of a tower are 45° and 60° respectively. Find the height of the tower and the horizontal distance between the tower and the building. (Use $\sqrt{3} = 1.73$)

OR,

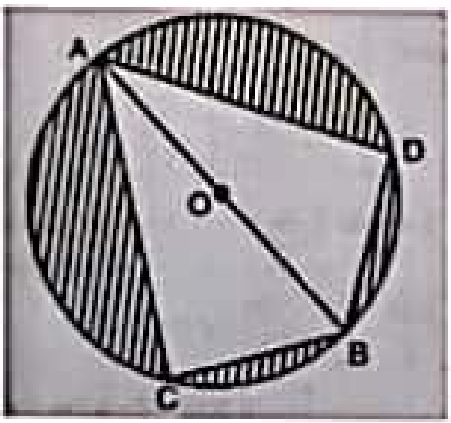
Two ships are approaching a light house from opposite directions. The angle of depression of two ships from top of the light house is 30° and 45°. If the distance between two ships is 100 m, find the height of light-house.

30. In the given figure below, find the area of the shaded region. (Use $\pi = 3.14$)



OR,

Find the area of the shaded region in the given figure, if BC = BD = 8 cm, AC = AD = 15 cm and O is the centre of the circle. (Take $\pi = 3.14$)



31. A cubical block of side 10 cm is surmounted by a hemisphere. What is the largest diameter that the hemisphere can have? Find the cost of painting the total surface area of the solid so formed, at the rate of Rs. 5 per 100 sq. cm. (Use $\pi = 3.14$)

32. A cone of maximum size is carved out from a cube edge 14 cm. Find the surface area of remaining solid after the cone is curved out.

33. The mean of the following distribution is 48 and sum of the frequencies is 50. Find the missing frequencies x and y.

Class	20-30	30-40	40-50	50-60	60-70
Frequency	8	6	x	11	Y

OR,

Find the mean and median for the following data:

Class	0-10	10-20	20-30	30-40	40-50
Frequency	8	16	36	34	6

34. A bag contains cards numbered 1 to 49. Find the probability that the number on the drawn card is:

(A) an odd number (B) a multiple of 5(C) Even prime

SECTION – D

Long Answer Type Questions (4 Marks Each)

35. Prove that:

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

OR,

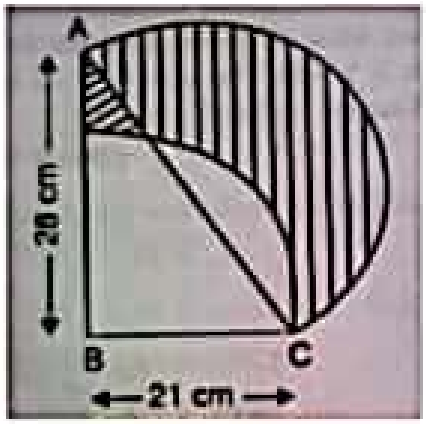
$$If\ \sin\theta = \frac{c}{\sqrt{c^2 + d^2}}\ and\ d > 0,\ find\ the\ value\ of\ \cos\theta\ and\ \tan\theta.$$

36. The angle of elevation of the top B of a tower AB from a point X on the ground is 60°. At a point Y, 40 m vertically above X, the angle of elevation of the top is 45°. Find the height of the tower AB and the distance XB.

OR,

At a point A, 20 m above the level of water in a lake, the angle of elevation of a cloud is 30°. The angle of depression of the reflection of the cloud in the lake, at A is 60°. Find the distance of the cloud from A?

37. In the figure given below, ABC is a right-angled triangle, angle B = 90°, AB = 28 cm and BC = 21 cm. With AC as diameter, a semi-circle is drawn. Find the area of the shaded region.



38. A right circular cone is divided into three parts trisecting its height by two planes drawn parallel to the base. Show that volumes of the three portions starting from the top are in the ration 1 :7 : 19.

39. The following table gives the daily income of 50 workers of a factory.

Daily income (in Rs.)	100-120	120-140	140-160	160-180	180-200
Number of workers	12	14	8	6	10

40. A box contains cards bearing numbers from 6 to 70. If one card is drawn at random from the box, find the probability that it bears.

(A) A one digit number

(B) A number divisible by 5.

(C) An odd number less than 30.

(D) A composite number between 50 and 70.

OR,

From a deck of 52 playing cards, Jacks and kings of red colour and Queen and Aces of black colour are removed. The remaining cards are mixed and a card is drown at random. Find the probability that the drawn card is –

(A) A black Queen

(B) A card of red colour

(C) A Jack of black colour

(D) A face card