CBSE Board
Class X Mathematics
Sample Paper 1 (Basic)

Time: 3 hrs   **Total Marks: 80**

General Instructions:
  a. All questions are compulsory
  b. The question paper consists of 40 questions divided into four sections A, B, C and D.
  c. Section A comprises of 20 questions of 1 mark each. Section B comprises of 6 questions of 2 marks each. Section c comprises of 8 questions of 3 marks each. Section D comprises 6 questions of 4 marks each.
  d. There is no overall choice. However internal choices have been provided in two questions of 1 mark each, two questions of 2 mark each, three questions of 3 marks each and three questions of 4 marks each. You have to attempt only one of the alternatives in all such questions.
 e. Use of calculators is not permitted.

Section A
(Questions 1 to 10 are multiple choice questions.
Select the most appropriate answer from the given options)

1. $\sqrt{3}$ is
  A. An integer
  B. A rational number
  C. An irrational number
  D. None of these

2. If mode = x(median) – y(mean) then
  A. x = 2, y = 3
  B. x = 3, y = 2
  C. x = 4, y = 3
  D. x = 3, y = 4

3. If the given figure, if TA and TP are tangents to a circle with centre O, so that ∠AOP = 130° then ∠ATP is
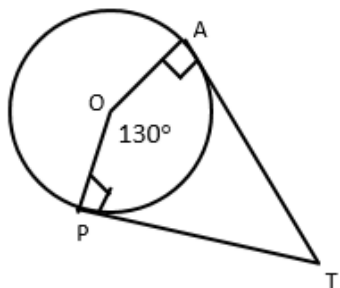
   A. 65°
   B. 50°
   C. 40°
   D. 70°

4. The product of a non-zero rational and an irrational number is
   A. Always rational
   B. Always irrational
   C. Rational or irrational
   D. 1

5. A die is thrown once. What is the probability of getting a number less than 3?
   A. $\dfrac{1}{2}$
   B. $\dfrac{1}{3}$
   C. $\dfrac{1}{6}$
   D. $\dfrac{1}{4}$

6. If α, β are the zeroes of $x^2 + 5x + 8 = 0$ then the value of $\alpha + \beta$ is
   A. 5
   B. −5
   C. 8
   D. −8

7. The exponent of 2 in the prime factorization of 144 is
   A. 4
   B. 5
   C. 6
   D. 3

8. Which of the following is a true statement?
   A. $x^2 + 5x - 3$ is a linear polynomial.
   B. $x^2 + 4x - 1$ is a binomial.
   C. $x + 1$ is a monomial.
   D. $5x^3$ is a monomial.

9. If A(-1, 0), B(5, -2) and C(8, 2) are the vertices of a triangle ABC, then its centroid is
   A. (12, 0)
   B. (6, 0)
   C. (0, 6)
   D. (4, 0)

10. In which quadrant does the point (-3, 5) lie?
    A. I
    B. II
    C. III
    D. IV

(Q 11 – Q 15) fill in the blanks

11. If P $\left(\dfrac{a}{3}, 4\right)$ is the midpoint of the line segment joining A(-6, 5) and B(-2, 3) then a =

12. If one zero of $3x^2 + 8x + k$ be the reciprocal of the other, then k =

    OR

    The area of the triangle formed by the line $\dfrac{x}{a} + \dfrac{y}{b} = 1$ with the coordinate axes is ___

13. The value of $\sin 45° \sin 30° + \cos 45° \cos 30°$ is ___

14. Without using trigonometric tables, $\sin 29° - \cos 61° =$ _____

15. ΔABC ~ ΔDEF such that ar(ΔABC) = 36 cm² and ar(ΔABC) = 49 cm². Then the ratio of their corresponding sides is ___

(Q 16 – Q 20) Answer the following

16. The value of $(\sec A + \tan A)(1 - \sin A) =$

    OR

    The value of $\cot \theta \times \tan \theta =$

17. Find the area of a sector of a circle of radius 28 cm and central angle 45°.

18. If P(B) = $\dfrac{3}{13}$ and n(S) = 52 then find n(B).

19. Find the sum of the -26, -24, -22,....to 36 terms.

20. The measures of three angles of a triangle are in the ratio 1:2:3. Then find the measures of angles of triangle.

Section B

21. A card is drawn at random from a pack of well-shuffled 52 playing cards. Find the probability that the card drawn is
   i.   an ace
   ii. A spade

22. Out of 200 students from a school, 135 like Kabaddi and the remaining students do not like the game. If one student is selected at random from all the students, find the probability that the student selected doesn't like Kabaddi.

OR

If two coins are tossed, find the probability of the following events:
   i.   Getting at least one head
   ii. Getting no head

23. In two concentric circles, prove that all chords of the outer circle which touch the inner are of equal length.
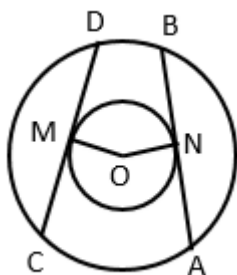
24. Prove that $\dfrac{\sin^2\theta}{\cos\theta} + \cos\theta = \sec\theta$

OR

Prove that $\cos^2\theta\,(1 + \tan^2\theta) = 1$

25. If the circumference and the area of a circle are numerically equal then find the diameter of a circle.

26. Read the following passage and answer the questions that follows: A teacher told 8 students to write a polynomial on the black board. Students wrote:

   i. $x + 2$

   ii. $x^2 + 5x + 3$

   iii. $x^4 + x^3 + x + 1$

   iv. $x^3 + 1$

   v. $x - 1$

   vi. $x^3 + x$

   vii. $x^2 + 7x$

  viii. $x^3 - x^2$

   1. How many students wrote cubic polynomial?

   2. Divide the polynomial $x^2 + 5x + 3$ by $x - 1$.

Section C

27. If α, β are the zeros of the polynomial $f(x) = x^2 - 5x + k$ such that $\alpha - \beta = 1$, find the value of k.

28. Draw a line segment AB of length 6.5 cm and divide it in the ratio 4:7. Measure each of the two parts.

29. The surface areas of a sphere and a cube are equal. Find the ratio of their volumes.

OR

A washing tub is in the shape of a frustum of a cone has height 21 cm. The radii of the circular top and bottom are 20 cm and 15 cm respectively. What is the capacity of the tub? Take $\pi = \dfrac{22}{7}$

30. If $\sin \theta = \dfrac{11}{61}$, find the value of $\cos \theta$ using trigonometric identity.

OR

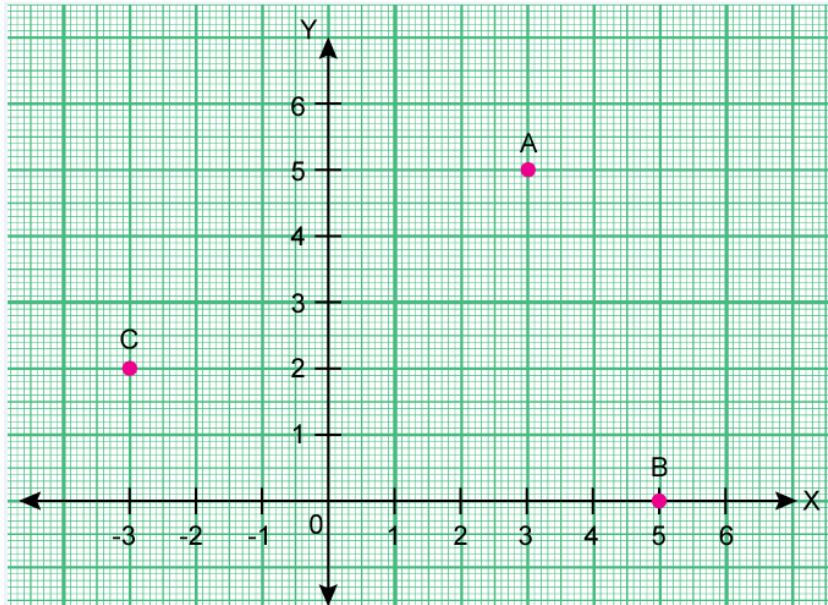If $\tan\theta + \dfrac{1}{\tan\theta} = 2$ then show that $\tan^2\theta + \dfrac{1}{\tan^2\theta} = 2$

31. Find the largest number which divides 546 and 764 leaving remainders 6 and 8 respectively.

OR

Give prime factorization of 4620.

32. Prove that the lengths of tangents drawn from an external point to a circle are equal.

33. Solve : $6x + 3y = 7$ and $3x + 9y = 11$

34. In the class room, three students A, B and C are sitting at A(3, 5), B(5, 0) and C(-3, 2) respectively. Then

1. Calculate the distance between student C and A as well as between student C and B.
2. If a student D will joins the class she sits at the mid-point of a student A and B. Find the coordinates of a student D.

Section D

35. For the data given below draw less than ogive curve.

Marks	0 - 10	10 - 20	20 – 30	30 - 40	40 - 50	50 – 60
Number of students	7	10	23	51	6	3

OR

Find the value of p, if the mean of the following distribution is 7.5

| x	3	5	7	9	11	13
f	6	8	15	p	8	4

36. The diagonal of a rectangular field is 60 metres more than the shorter side. If the longer side is 30 metres more than the shorter side, find the length of the sides of the field.

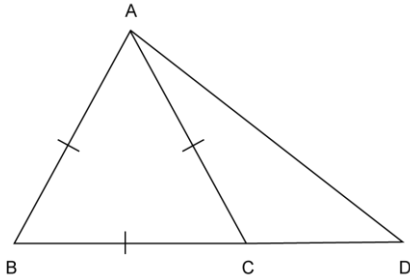**37.** Determine the general term of an AP whose 7th term is −1 and 16th term is 17.

OR

The sum of n, 2n and 3n terms of an AP are S_1, S_2 and S_3, respectively. Prove that $S_3 = 3(S_2 - S_1)$.

38. In an isosceles $\triangle ABC$, the base AB is produced both ways in P and Q such that $AP \times BQ = AC^2$. Prove that $\triangle ACP \sim \triangle BCQ$.
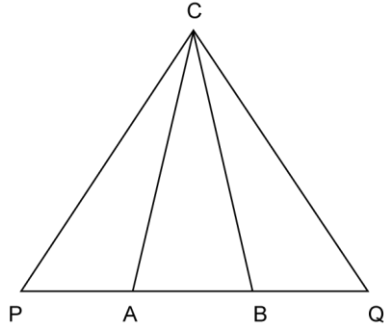
OR

In $\triangle ABC$, AB = AC. Side BC is produced to D. Prove that $\left(AD^2 - AC^2\right) = BC.CD$

39. A tree was broken by wind and the top of the tree touched the ground making an angle of 30°. If the point where the top touched the ground to the bottom of the tree is 20 m, then find the height of the tree before it was broken.

40. From a solid cylinder with height 8 cm and radius 6 cm, a conical cavity of height 8 cm and base radius 6 cm is hollowed out. Find the volume of the remaining solid.
(use π = 3.14)