CBSE Board

Class X Mathematics

Sample Paper 2 (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)

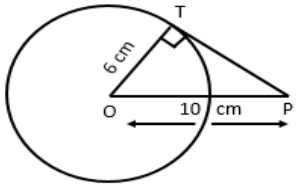
1. $3.\overline{27}$ is

A. An integer
B. A rational number
C. A natural number
D. An irrational number

2. If the mean of 6, 7, x, 8, y, 14 is 9 then

A. $x + y = 21$
B. $x + y = 19$
C. $x - y = 19$
D. $x - y = 21$

3. In the given figure, PT is a tangent to the circle with centre O. If OT = 6 cm and OP = 10 cm, then the length of tangent PT is



A. 8 cm
B. 10 cm
C. 12 cm
D. 16 cm

4. The smallest number by which $\sqrt{27}$ should be multiplied so as to get a rational number is

A. $\sqrt{27}$
B. $3\sqrt{3}$
C. $\sqrt{3}$
D. 3

5. Which of the following cannot be the probability of occurrence of an event?

A. $\frac{2}{3}$
B. −1.5
C. 15%
D. 0.7

6. A quadratic polynomial, the sum of whose zeroes is 0 and product is 3, is

A. $x^2 - 9$
B. $x^2 + 9$
C. $x^2 + 3$
D. $x^2 - 3$

7. The decimal expansion of the rational number $\frac{33}{2^2 \times 5}$ will terminate after

A. One decimal place
B. Two decimal places
C. Three decimal places
D. More than 3 decimal places

8. If the sum of the zeros of the quadratic polynomial $kx^2 + 2x + 3k$ is equal to the product of its zeros then k =

A. $\frac{1}{3}$
B. $\frac{-1}{3}$
C. $\frac{2}{3}$
D. $-\frac{2}{3}$

9. The distance between the points P(-1, 1) and Q(5, -7) is

A. 11 units
B. 10 units
C. 5 units
D. 7 units

10. If the centroid of the triangle formed by (7, x), (y, -6) and (9, 10) is at (6, 3) then (x, y) =

A. (2, 5)
B. (5, 2)
C. (3, 5)
D. (5, 3)

(Q 11 – Q 15) fill in the blanks

11. The point which divides the join of A(-1, 7) and B(4, -3) in the ratio 2:3 then its coordinates are ____

12. If x = 3 is a solution of the equation $3x^2 + (k - 1)x + 9 = 0$ then k is ___

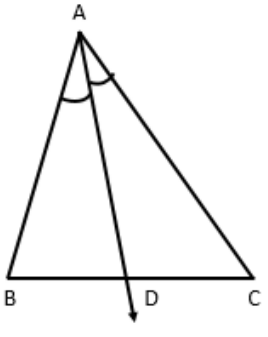
OR

The system of equations $3x - 2y = 0$ and $kx + 5y = 0$ has infinitely many solutions. Then k = ____

13. The value of $(\sin 40° - \cos 50°)$ is ____

14. If $2\sin 2\theta = \sqrt{3}$ then $\theta =$ ___

15. In a triangle ABC, AD is the bisector of $\angle A$. If AB = 5.6 cm, AC = 4 cm and DC = 3 cm then BD = ___



(Q 16 – Q 20) Answer the following

16. Find the value of $(1 - \cos^2 A)\sec^2 A$.

OR

If $\sin 3A = \cos(A - 10°)$ where 3A is an acute angle then $\angle A = ?$

17. A wheel covers 88 km. Then find the diameter of the wheel.

18. If the probability of winning a game is 0.4, the probability of losing it is?

19. Find the 8^{th} term of the A.P. 5, 2, -1, -4, -7,...

20. A die is rolled. What is the probability that the number appearing on upper face is less than 3?

Section B

21. There are 2 red, 2 white and 2 green balls in a bag. One ball is drawn at random. C is the event that the ball is not green. Find the probability that getting the ball is not green.

22. Each card bears one letter from the word 'mathematics'. The cards are placed on a table upside down. Find the probability that a card drawn bears the letter 'm'.

OR

Six faces of a die are as shown below

A B C D E A

If the die is rolled once, find the probability that

i. 'A' appears on upper face

ii. 'D' appears on upper face

23. In two tangents are drawn from an external point then prove that

i. They subtend equal angles at the centre and

ii. They are equally inclined to the line segment joining the centre to that point.

24. Prove that $\frac{1-\tan^2 A}{\cot^2 A-1}=\tan^2 A$

OR

Prove that $\frac{\tan\theta}{\sec\theta-1}+\frac{\tan\theta}{\sec\theta+1}=2\operatorname{cosec}\theta$

25. If the area of a quadrant of a circle whose circumference is 22 cm.

26. Read the following passage and answer the questions that follows: A teacher has given students homework to write some examples of polynomials. Some examples are given below:

i. $x + 2$

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

iii. $x^2 + x + 1$

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 linear polynomial?
2. Divide the polynomial $x^2 + x + 1$ by $x + 2$.

Section C

27. Find k if the sum of the roots of the quadratic equation $x^2 - 4kx + k + 3 = 0$ is double their product.

28. Construct a ΔABC in which BC = 5 cm, CA = 6 cm and AB = 7 cm. Construct a $\Delta A'BC'$ similar to ΔABC, each of whose sides is $\frac{7}{5}$ times the corresponding sides of ΔABC.

29. The areas of two concentric circles are $962.5\ cm^2$ and $1386\,cm^2$. Find the width of the ring.

OR

A spherical glass vessel has a cylindrical neck 7 cm long and 4 cm in diameter. The diameter of the spherical part is 21 cm. Find the quantity of water it can hold. Use = $\pi = \frac{22}{7}$.

30. Prove that $\sec\theta\,(1 - \sin\theta)(\sec\theta + \tan\theta) = 1$

OR

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

31. Prove that $\sqrt{5} + \sqrt{3}$ is irrational given that $\sqrt{3}$ is an irrational number.

OR

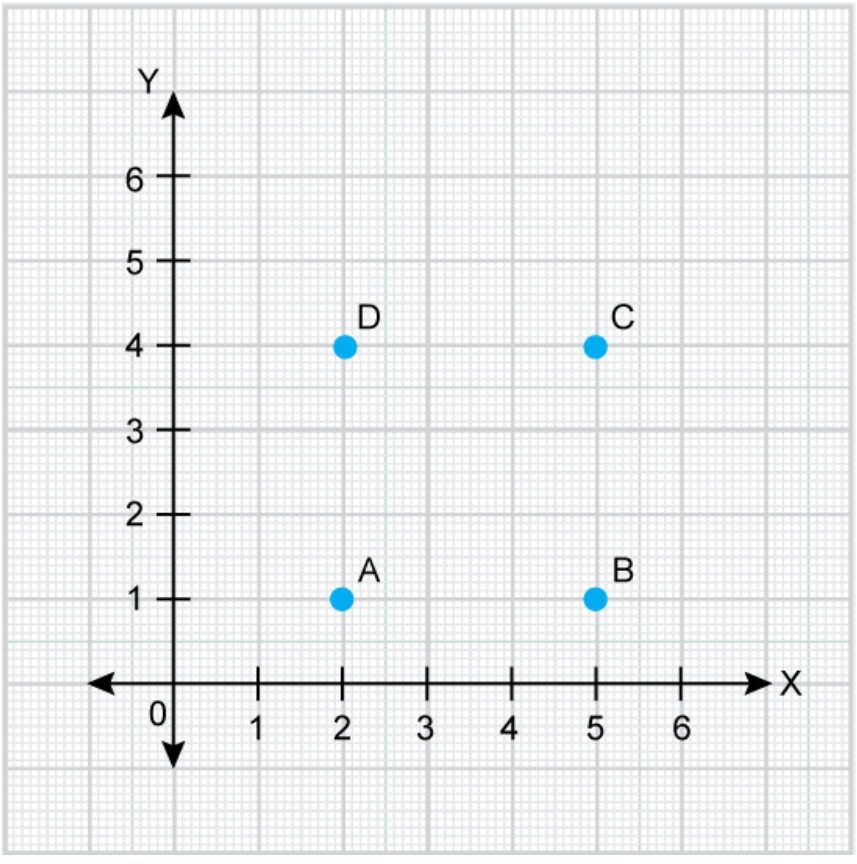
Prove that $\frac{2\sqrt{2}}{3}$ is irrational.

32. Prove that the parallelogram circumscribing a circle, is a rhombus.

33. Find the value of k for which the system of equations $3x + y = 1$ and $kx + 2y = 5$ has
(i) a unique solution (ii) no solution

34. Read the following passage and answer the questions that follows: In a class room, four students A, B, C and D are sitting at A(2, 1), B(5, 1), C(5, 4) and D(2, 4) respectively. Then a new student E joins the class

i. Teacher tells E to sit in the middle of the students B and D. Find the coordinates of the position where E can sit.
ii. Calculate the distance between A and C.
iii. Calculate the distance between B and D.



Section D

35. The table below shows the daily expenditure on food of 30 households in a locality:

Daily expenditure	No. of households
100–150	6
150–200	7
200–250	12
250–300	3
300–350	2

Find the mean and median daily expenditure on food.

OR

Following is the distribution of marks of 70 students in a periodical test:

Marks	No. of students
Marks less than 10	3
Marks less than 20	11
Marks less than 30	28
Marks less than 40	48
Marks less than 50	70

Draw a cumulative frequency curve for the above data and find the median.

36. The sum of two numbers is 8. Determine the numbers if the sum of their reciprocal is $\frac{8}{15}$.

37. If the 9^{th} and 21^{st} terms of an A.P. are 75 and 183 respectively, find its 81^{st} term?

OR

Find the nth term and 16^{th} term of the AP 3, 5, 7, 9, 11,...

38. A person is standing at a distance of 80 m from a church looking at its top. The angle of elevation is of 45°. Find the height of the church.

OR

The angle of elevation of a cloud from a point 60 metres above a lake is 30° and the angle of depression of the reflection of the cloud in the lake is 60°. Find the height of the cloud.

39. A bucket is in the form of a frustum of a cone and its can hold 28.49 litres of water. If the radii of its circular ends are 28 cm and 21 cm, find the height of the bucket. $\left[\text{Use } \pi = \frac{22}{7}\right]$

40. Prove that the ratio of the areas of two similar triangles is equal to the ratio of the square of their corresponding sides.