

CBSE Board
Class X Mathematics
Sample Paper 2 (Standard)

Time: 3 hrs

Total Marks: 80

General Instructions:

1. All questions are **compulsory**.
 2. The question paper consists of **40** questions divided into **four sections** A, B, C, and D. **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 and **Section D** comprises of **6** questions of 4 marks each.
 3. There is no overall choice. However, an internal choice has been provided in two questions of 1 mark each, **two questions of 2 marks** 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.
 4. Use of calculator is **not** permitted.
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Section A

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

1. The decimal expansion of the rational number $\frac{2^3}{2^2.5}$ will terminate after
 - A. one decimal place
 - B. Two decimal places
 - C. Three decimal places
 - D. More than three decimal places
2. A letter is chosen at random from the word "PROBABILITY". The probability that it is a vowel is
 - A. $\frac{1}{11}$
 - B. $\frac{2}{11}$
 - C. $\frac{3}{11}$
 - D. $\frac{4}{11}$
3. Which of the following numbers is irrational?
 - A. 2.454545...
 - B. 0.11111...
 - C. 0.101100101010...
 - D. 0.23232323

4. If the system of equations $2x + 3y = 5$, $4x + ky = 10$ has infinitely many solutions, then k =
- A. 1
 - B. $\frac{1}{2}$
 - C. 3
 - D. 6
5. The value of $\cos^2 17^\circ - \sin^2 73^\circ$ is
- A. 1
 - B. $\frac{1}{3}$
 - C. 0
 - D. -1
6. $\frac{2\tan 30^\circ}{1 - \tan^2 30^\circ} =$
- A. $\cos 60^\circ$
 - B. $\sin 60^\circ$
 - C. $\tan 60^\circ$
 - D. $\sin 30^\circ$
7. If θ and $2\theta - 45^\circ$ are acute angles such that $\sin \theta = \cos (2\theta - 45^\circ)$, then $\tan \theta =$
- A. 1
 - B. -1
 - C. $\sqrt{3}$
 - D. $\frac{1}{\sqrt{3}}$
8. The mid-point of the line segment joining P(-2,8) and Q(-6,-4) is
- A. (-4, 2)
 - B. (4, 2)
 - C. (4, -2)
 - D. (-4, -2)
9. The value of x , for which the points $(x, -1)$, $(2, 1)$ and $(4, 5)$ lie on a line is
- A. 0
 - B. 1
 - C. 2
 - D. 3
10. The ordinate of a point is twice its abscissa. If its distance from the point $(4, 3)$ is $\sqrt{10}$, then the coordinates of the point are
- A. (1, 2) or (3, 5)
 - B. (1, 2) or (3, 6)
 - C. (2, 1) or (6, 3)
 - D. (2, 1) or (3, 6)

(Q 11 – Q 15) Fill in the blanks

11. The maximum volume of a cone that can be carved out of a solid hemisphere of radius r is ____
12. If the sum of the zeros of the polynomial $f(x) = 2x^3 - 3kx^2 + 4x - 5$ is 6, then the value of k is ____
13. $\Delta ABC \sim \Delta DEF$. If $BC = 3$ cm, $EF = 4$ cm and $\text{ar}(\Delta ABC) = 54$ cm² then $\text{ar}(\Delta DEF) =$ ____
14. The first term of an A.P. is p and its common difference is q . Its 10th term ____

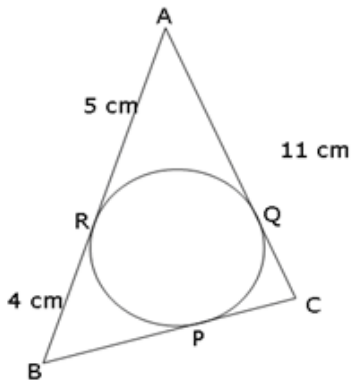
OR

The value of x for which $2x$, $x + 10$, and $3x + 2$ are in A.P. is ____

15. For a given data with 70 observations the 'less than ogive' and the 'more than ogive' intersect at (20.5, 35). The median of the data is ____

(Q 16 – Q 20) Answer the following

16. What is the LCM of $2^3 \times 3 \times 5$ and $2^4 \times 5 \times 7$?
17. If the diagonals of a quadrilateral divide each other proportionally, then it is a ____
18. In the given figure, $AR = 5$ cm, $BR = 4$ cm and $AC = 11$ cm. What is the length of BC ?



19. Which term of the AP 3, 8, 13, 18, ... is 88?

OR

The 11th term of the AP $(5a - x)$, $6a$, $(7a + x)$, ...

20. Determine the values of p for which the quadratic equation $2x^2 + px + 8 = 0$ has real and equal roots.

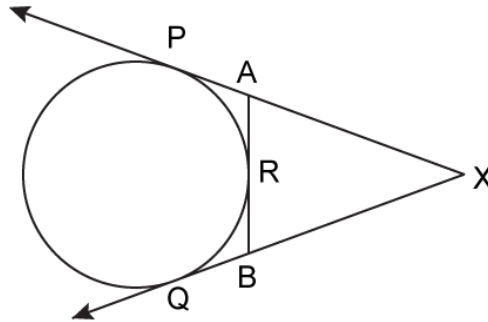
Section B

21. Find the H.C.F of 455 and 84 using the division algorithm.

OR

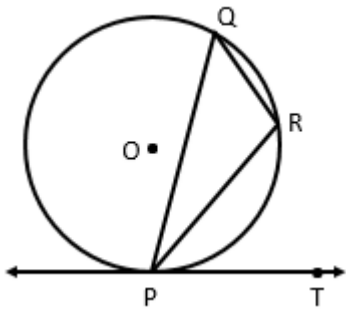
Show that any number of the form 4^n , $n \in \mathbb{N}$ can never end with the digit 0.

22. In the given figure, XP and XQ are tangents from X to the circle. R is a point on the circle. Prove that $XA + AR = XB + BR$.

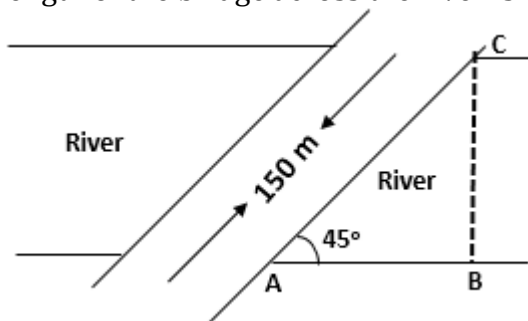


OR

In the figure, PQ is a chord of a circle with centre O and PT is a tangent. If $\angle QPT = 60^\circ$, find $\angle PRQ$.



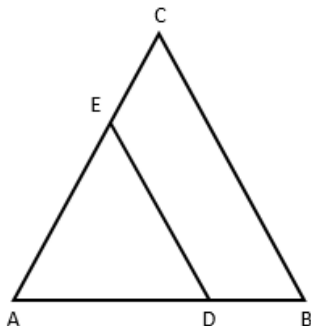
23. A bridge across a river makes an angle of 45° with the river bank as shown in the figure. If the length of the bridge across the river is 150 m, what is the width of the river?



24. A bag contains 3 red balls and 5 black balls. A ball is drawn at random from the bag. What is the probability that the ball drawn is (i) red (ii) not red?

25. A cylinder and a cone have bases of equal radii and of equal heights. Show that their volumes are in the ratio of 3:1.

26. In the adjoining figure, DE is parallel to BC. If $AD = x$, $DB = x - 2$, $AE = x + 2$ and $EC = x - 1$, find the value of x .



Section C

27. Prove that: $\frac{\sec A + \tan A}{\sec A - \tan A} = \left(\frac{1 + \sin A}{\cos A} \right)^2$

OR

Without using tables evaluate:

$$\left(\frac{\sin 47^\circ}{\cos 43^\circ} \right)^2 + \left(\frac{\cos 43^\circ}{\sin 47^\circ} \right)^2 - 4 \cos^2 45^\circ$$

28. Find the area of the quadrilateral ABCD whose vertices are A(1, 1), B(7, -3), C(12, 2) and D(7, 21) respectively.

29. Solve for x and y :

$$\frac{x}{a} + \frac{y}{b} = 2; \quad ax - by = a^2 - b^2$$

30. Prove that $\frac{3}{2\sqrt{5}}$ is an irrational number.

OR

Find the HCF of 96 and 404 by prime factorisation method. Hence, find their LCM.

31. Find the mean of following distribution by the step deviation method.

Daily Expenditure:	100-150	150-200	200-250	250-300	300-350
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No. of householders:	4	5	12	2	2
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OR

Cards numbered from 1 to 18 are put in a box and mixed thoroughly. One card is drawn at a random. Find the probability that the card drawn bears:

- a prime number
- a factor of 18
- a number divisible by 2 and 3

32. The 14th term of an A.P. is twice its 8th term. If its 6th term is -8, then find the sum of its first 20 terms.

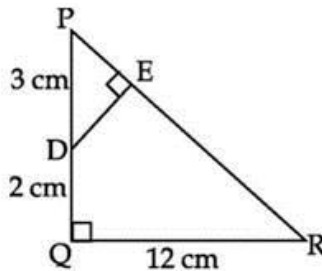
33. Find all zeros of the polynomial $(2x^4 - 9x^3 + 5x^2 + 3x - 1)$ if two of its zeros are $(2 + \sqrt{3})$ and $(2 - \sqrt{3})$.

34. Find the area of the minor segment of a circle of radius 14 cm, when its central angle is 60° . Also find the area of the corresponding major segment. [Use $\pi = \frac{22}{7}$]

Section D

35. Construct a triangle similar to ΔABC in which $AB = 4.6$ cm, $BC = 5.1$ cm, $m \angle A = 60^\circ$ with scale factor 4 : 5.

36. In the given figure, ΔPQR is right-angled triangle right-angled at Q. $DE \perp PR$. Prove $\Delta PQR \sim \Delta PED$ and find the lengths of PE and DE if $PD = 3$ cm, $QD = 2$ cm and $QR = 12$ cm.



37. From a window of a house in a street, h metres above the ground, the angles of elevation and depression of the top and the foot of another house on the opposite side of the street are α and β respectively. Show that the height of the opposite house is $h(1 + \tan \alpha \cdot \cot \beta)$ metres.

OR

A man in a boat rowing away from a light house 100 m high, takes 2 minutes to change the angle of elevation of the top of the light house from 60° to 45° . Show that

the speed of the boat is $50 \left(\frac{3 - \sqrt{3}}{3} \right)$ m/min.

38.A tent is of the shape of a right circular cylinder upto a height of 3 metres and conical above it. The total height of the tent is 13.5 metres above the ground. Calculate the cost of painting the inner side of the tent at the rate of Rs. 2 per square metre, if the radius of the base is 14 metres.

39.The following table gives production yield per hectare of wheat of 100 farms of a village.

Production yield	50 - 55	55 - 60	60 - 65	65 - 70	70 - 75	75 - 80
Number of farms	2	8	12	24	38	16

Change the distribution to a 'more than' type distribution and draw ogive.

OR

An integer is chosen at random from 1 to 50. Find the probability that the number is:

(i) divisible by 5

(ii) a perfect cube

(iii) a prime number

40.By increasing the list price of a book by Rs. 10, a person can buy 10 less books for Rs. 1200. Find the original list price of the book.

OR

A motor boat, whose speed is 15km/ hr in still water, goes 30 km downstream and comes back in a total time of 4hrs 30mins. Find the speed of the stream.