

Mathematics Standard

Sample Question Paper 3

Class X | Code 041 | 2026-27

Time Allowed: 3 Hours

Maximum Marks: 80

General Instructions

1. This question paper contains 38 questions. All questions are compulsory.
2. The question paper is divided into five sections A, B, C, D and E.
3. Section A has 18 MCQs and 2 assertion-reason questions of 1 mark each.
4. Section B has Questions 21 to 25 of 2 marks each.
5. Section C has Questions 26 to 31 of 3 marks each.
6. Section D has Questions 32 to 35 of 5 marks each.
7. Section E has Questions 36 to 38, case studies of 4 marks each, with subparts of 1, 1 and 2 marks.
8. There is no overall choice. Internal choice is provided in two questions each in Sections B, C and D, and in the 2-mark subpart of each case study in Section E.
9. Draw neat figures wherever required. Use $\pi = 22/7$ unless another value is stated.
10. Use of calculators is not allowed.

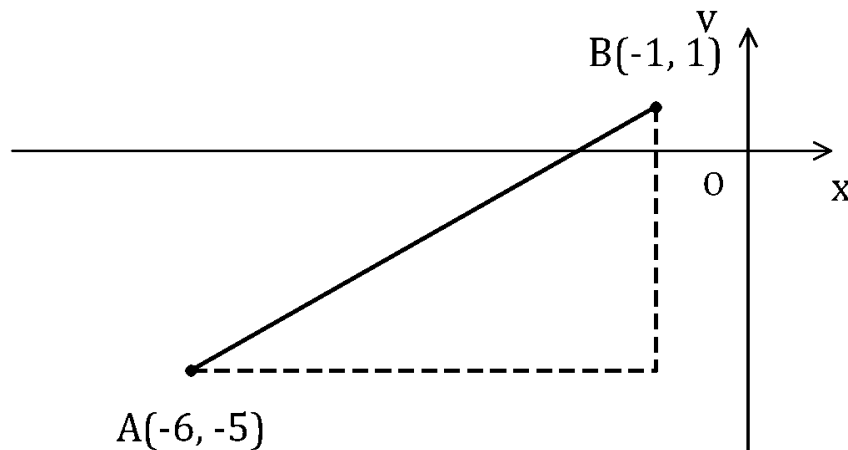
SECTION A

Questions 1 to 20 carry 1 mark each. ($20 \times 1 = 20$)

1. A card is drawn at random from cards numbered 1 to 34. The probability of a perfect-square number is:

- (A) $\frac{3}{17}$ (B) $\frac{2}{17}$
(C) $\frac{5}{34}$ (D) $\frac{29}{34}$

2. Using the coordinate diagram, the distance between A(-6, -5) and B(-1, 1) is:



- (A) $\sqrt{61}$ units (B) $\sqrt{65}$ units
(C) 11 units (D) 1 units

3. The table gives the time spent on revision by a group of students. The modal class is:

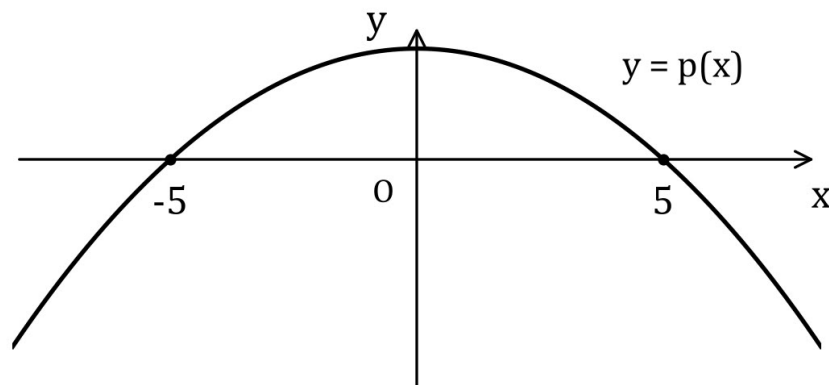
Minutes	0-10	10-20	20-30	30-40	40-50
Students	5	7	14	9	4

- (A) 0-10 minutes
(B) 10-20 minutes
(C) 30-40 minutes
(D) 20-30 minutes

4. The lines $4x + 2y = 5$ and $16x + ky = 7$ are parallel when k is:

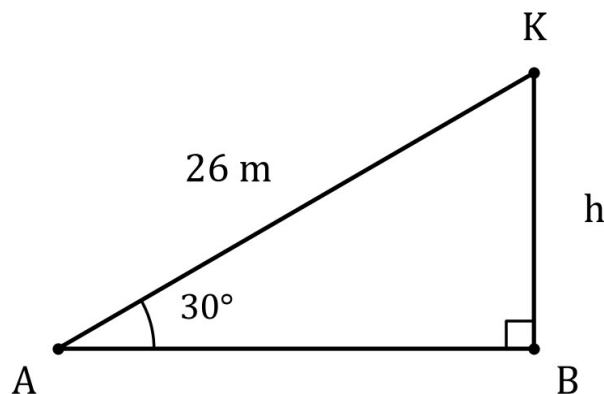
- (A) 8
(B) 4
(C) -8
(D) 9

5. The graph of a quadratic polynomial $p(x)$ is shown. The sum of its zeroes is:



- (A) 1
(B) 0
(C) -1
(D) 2

6. A kite is attached to a taut string of length 26 m, held at ground level. Using the angle shown, its height above the ground is:



- (A) 13 m
(B) 26 m
(C) 14 m
(D) 12 m

7. For an acute angle θ , $\sin \theta = \frac{15}{17}$. Find $\cot \theta$.

- (A) $\frac{15}{8}$ (B) $\frac{8}{17}$
(C) $\frac{17}{15}$ (D) $\frac{8}{15}$

8. In $\triangle ABC$, D lies on AB and E on AC; $DE \parallel BC$, $AD : DB = 4 : 5$ and $BC = 45$ cm. DE equals:

- (A) 21 cm (B) 20 cm
(C) 22 cm (D) 45 cm

9. P divides A(-3, 4) and B(22, 24) internally in the ratio 3 : 2. P is:

- (A) (13, 16) (B) (12, 16)
(C) (12, 17) (D) (11, 15)

10. The roots of $x^2 - 4x = 0$ are:

- (A) 0, -4 (B) 4, -4
(C) 1, 4 (D) 0, 4

11. One card is drawn from a well-shuffled standard pack of 52 cards. What is the probability of drawing a black king?

- (A) $\frac{3}{52}$ (B) $\frac{1}{52}$
(C) $\frac{1}{26}$ (D) $\frac{25}{26}$

12. The HCF of 20 and 35 is 5. Their LCM is:

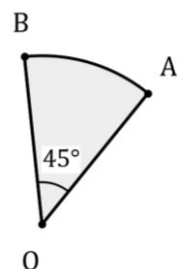
- (A) 145 (B) 55
(C) 140 (D) 5

13. The 14th term of the AP -1, 3, 7, ... is:

- (A) 55 (B) 47
(C) 51 (D) 59

14. In the sector diagram, a circle has radius 35 cm. Find the length of the arc subtending 45° at its centre.

- (A) $\frac{55}{4}$ cm (B) $\frac{55}{2}$ cm
(C) 55 cm (D) $\frac{69}{2}$ cm



15. A bag contains 5 red, 8 blue and 4 green balls. One ball is drawn at random. The probability that it is not blue is:

- (A) 0
(B) $\frac{9}{17}$
(C) 1
(D) $\frac{5}{17}$

16. The mean ages of men and women in a group are 42 and 26 years. The combined mean is 32 years. The percentage of women is:

- (A) 25%
(B) 50%
(C) 75%
(D) 62.5%

17. A cone of radius 3 cm and height 3 cm is joined to a hemisphere of the same radius. The volume of the solid is:

- (A) $27\pi \text{ cm}^3$
(B) $54\pi \text{ cm}^3$
(C) $9\pi \text{ cm}^3$
(D) $81\pi \text{ cm}^3$

18. An arc has length 4π cm and its sector has area $14\pi \text{ cm}^2$. The radius is:

- (A) 7 cm
(B) 14 cm
(C) $\frac{7}{2}$ cm
(D) 9 cm

For Questions 19 and 20, choose the correct option:

- (A) Both A and R are true, and R is the correct explanation of A.
(B) Both A and R are true, but R is not the correct explanation of A.
(C) A is true, but R is false.
(D) A is false, but R is true.

19. Assertion (A): The zeroes of $x^2 - 10x + 24$ are 4 and 6.

Reason (R): A real number a is a zero of $p(x)$ precisely when $p(a) = 0$.

20. Assertion (A): If $A(2, 1)$ and $B(t, 5)$ lie on the circle with centre $O(-2, 1)$, then $t = -2$.

Reason (R): The centre of a circle is the midpoint of every chord.

SECTION B

Questions 21 to 25 carry 2 marks each. ($5 \times 2 = 10$)

21. (A) Two tanks contain 175 litres and 275 litres of water. Find the greatest capacity of a container that measures either quantity an exact number of times.

OR

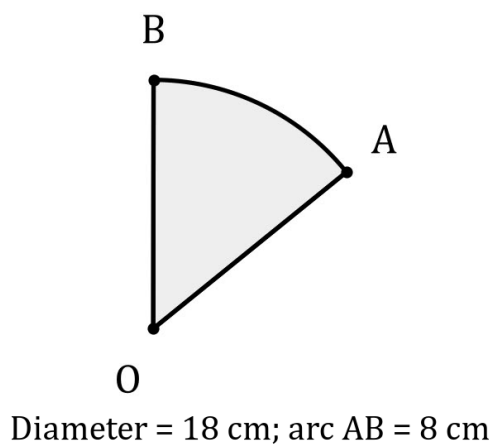
(B) The HCF of 96 and 168 is written as $5m - 5$. Find m .

22. (A) In $\triangle ABC$, D is on AB and E on AC , with $DE \parallel BC$. Given $AD = 6$ cm, $DB = 10$ cm and $AE = 18$ cm, find the full length AC .

OR

(B) In $\triangle PQR$, S lies on PQ and T on PR . Given $PS = 10$ cm, $SQ = 15$ cm, $PT = 20$ cm and $TR = 31$ cm, decide whether $ST \parallel QR$. Justify your answer.

23. The shaded sector has the dimensions shown. Find its area.



24. For an acute angle θ , $\tan \theta = \frac{4}{7}$. Find $\sin \theta$ and $\cos \theta$.

25. Two fair dice, one red and one blue, are thrown together. Find the probability that (i) the sum is an odd number, and (ii) this event does not occur.

SECTION C

Questions 26 to 31 carry 3 marks each. ($6 \times 3 = 18$)

26. (A) For an acute angle θ , $\tan \theta + \cot \theta = 5$. Find $\tan^2 \theta + \cot^2 \theta$ and $\tan^3 \theta + \cot^3 \theta$.

OR

(B) For an acute angle θ , $\operatorname{cosec} \theta - \cot \theta = \frac{1}{4}$. Find $\operatorname{cosec} \theta$ and $\cot \theta$.

27. (A) The sum of the first 14 terms of an AP is 420, and its fourth term is 16. Find its twentieth term.

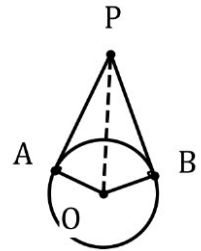
OR

(B) Find the sum of all integers strictly between 12 and 170 that are divisible by 6.

28. Find the coordinates of the points of trisection of the segment joining A(-4, 2) and B(8, 17).

29. Find the zeroes of $3x^2 - 3x - 36$ and verify the relationships between its zeroes and coefficients.

30. PA and PB are tangents from P to the circle with centre O, as shown. OA = 25 cm and OP = 65 cm. Find PA and the perimeter of quadrilateral OAPB. State the geometric facts used.



31. Given that $\sqrt{5}$ is irrational, prove that $3 + 4\sqrt{5}$ is irrational.

SECTION D

Questions 32 to 35 carry 5 marks each. ($4 \times 5 = 20$)

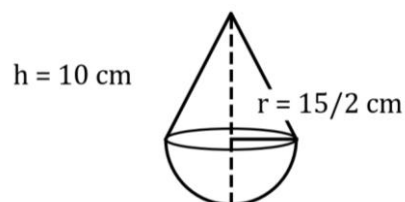
32. (A) An observer on the deck of a ship, 12 m above water, sees the top of a hill at an elevation of 60° and its foot at a depression of 30° . Find the horizontal distance to the hill and its height above water.

OR

(B) From a window 26 m above level ground, the angles of elevation of the top and depression of the foot of a building across a street are 60° and 45° . Find the street width and the height of that building. Give exact values.

33. After the price of a book is reduced by ₹5, a customer can buy 5 more books for ₹750. Find the original price and the original number of books the customer could buy.

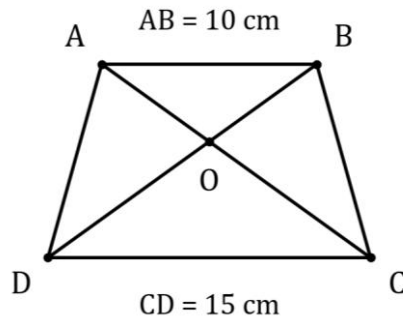
34. (A) A wooden toy is formed by a cone fixed on a hemisphere of the same radius $\frac{15}{2}$ cm. Its total height is $\frac{35}{2}$ cm. Find the exposed surface area and the cost of painting it at ₹6 per cm^2 . Give exact values.



OR

(B) A closed thin-sheet model consists of a cylinder with a cone attached at each end. The common radius is 2 cm, the total length is $\frac{43}{3}$ cm, and each cone is $\frac{8}{3}$ cm high. Find the volume of air inside and the total outer surface area. Neglect sheet thickness and give exact values.

35. Using the figure, in trapezium ABCD, $AB \parallel CD$, $AB = 10$ cm and $CD = 15$ cm. Diagonals AC and BD intersect at O, with $AC = 50$ cm and $BD = 50$ cm. Prove that $\triangle AOB \sim \triangle COD$, and find AO, OC, BO and OD.



SECTION E

Questions 36 to 38 carry 4 marks each. ($3 \times 4 = 12$)

36. Tiwari Academy records the scores of 53 students in a mathematics quiz. The grouped frequency distribution is given below. The classes are continuous, with the upper endpoint excluded from each class.

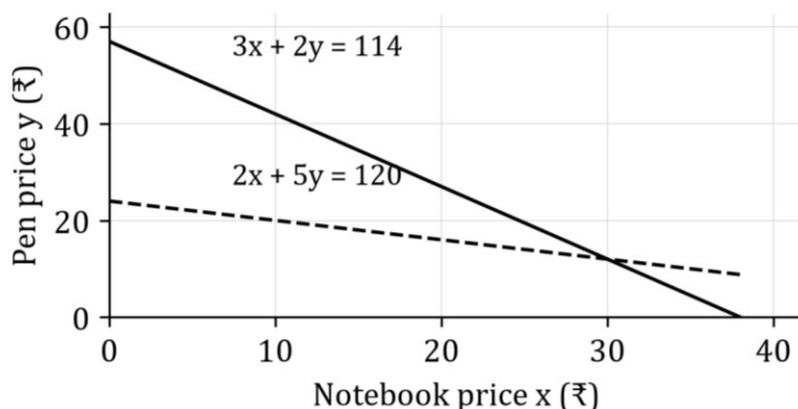
Score	0-10	10-20	20-30	30-40	40-50
Students	5	8	12	18	10

- (i) State the modal class.
- (ii) State the median class.
- (iii) (A) Calculate the mean score, correct to two decimal places.

OR

- (iii) (B) Calculate the mode, correct to two decimal places.

37. A school buys notebooks and pens for its mathematics club. Three notebooks and two pens cost ₹114, while two notebooks and five pens cost ₹120. Let the price of a notebook be ₹x and that of a pen be ₹y. The accompanying graph represents these data.



- (i) Write the equation for the first purchase.

(ii) Write the equation for the second purchase.

(iii) (A) Find the price of each item.

OR

(iii) (B) Find the cost of four notebooks and three pens.

38. A circular garden has two concentric boundaries with centre O and radii 15 m and 9 m. A straight path AB is a chord of the outer circle and touches the inner circle at M.

(i) Find $\angle OMA$.

(ii) Find AM.

(iii) (A) Find AB and the area of $\triangle OAB$.

OR

(iii) (B) Another chord of the outer circle is 12 m from O. Find its length.