

Mathematics Standard

Sample Question Paper 6

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.

SECTION A

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

1. A tower of height 15 m casts a shadow of length 15 m on level ground. The angle of elevation of the Sun is:

- (A) 30° (B) 45°
(C) 60° (D) 90°

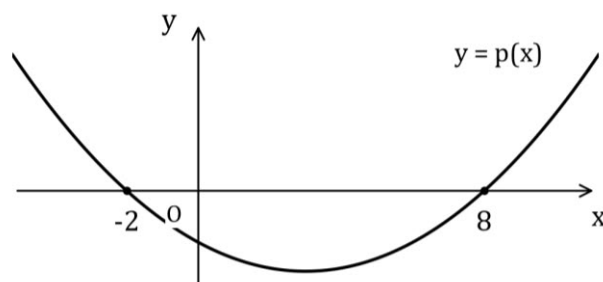
2. Which term of the AP 5, 7, 9, ... is 37?

- (A) 18 (B) 17
(C) 16 (D) 19

3. A wheel of diameter 42 cm travels $\frac{231}{50}$ km. Its number of complete revolutions is:

- (A) 350 (B) 35000
(C) 4000 (D) 3500

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



- (A) -16 (B) -15
(C) -17 (D) -14

5. For a distribution, mean = 30 and median = 33. The estimated mode using the empirical relation is:

- (A) 42 (B) 36
(C) 39 (D) 63

6. The HCF of 32 and 56 is 8. Their LCM is:

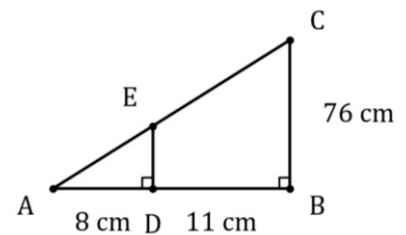
- (A) 232 (B) 224
(C) 88 (D) 8

7. A circle has radius 56 cm. Find the length of the arc subtending 90° at its centre.

- (A) 88 cm (B) 44 cm
(C) 176 cm (D) 95 cm

8. In the figure, AD = 8 cm, DB = 11 cm and BC = 76 cm. DE and BC are perpendicular to AB. The length DE is:

- (A) 32 cm (B) 36 cm
(C) 28 cm (D) 33 cm



9. For $x^2 + px + 49 = 0$ to have equal roots, p must be:

- (A) 7 (B) -7
(C) ± 14 (D) 0

10. If $x - y = -1$ and $x + y = 13$, then (x, y) equals:

- (A) (7, 6) (B) (-6, 7)
(C) (6, -7) (D) (6, 7)

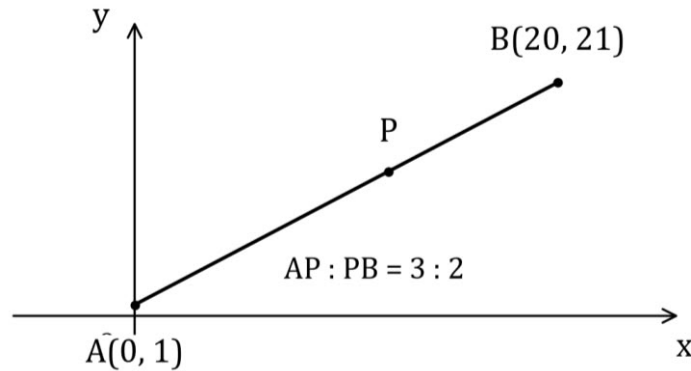
11. The distance between A(-3, 1) and B(2, 6) is:

- (A) $\sqrt{54}$ units
(B) 10 units
(C) 0 units
(D) $\sqrt{50}$ units

12. A card is drawn at random from cards numbered 1 to 40. The probability of a perfect-square number is:

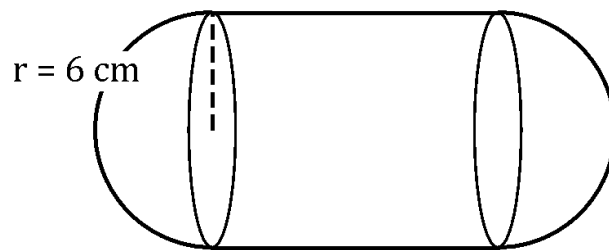
- (A) $\frac{7}{40}$ (B) $\frac{3}{20}$
(C) $\frac{1}{8}$ (D) $\frac{17}{20}$

13. Using the coordinate diagram, p divides A(0, 1) and B(20, 21) internally in the ratio 3 : 2. P is:



- (A) (12, 13) (B) (13, 13)
(C) (12, 14) (D) (11, 12)

14. The solid shown is described as follows. A capsule has a cylindrical middle of radius 6 cm and length 9 cm, with a hemisphere of radius 6 cm at each end. Its total length is:



- (A) 15 cm (B) 9 cm
(C) 24 cm (D) 21 cm

15. The value of $9\sec^2\theta - 9\tan^2\theta$, where defined, is:

- (A) 0 (B) 1
(C) 9 (D) 18

16. A bag contains 8 red, 6 blue and 4 green balls. One ball is drawn at random. The probability that it is not blue is:

- (A) $\frac{2}{3}$ (B) 0
(C) 1 (D) $\frac{4}{9}$

17. One card is drawn from a well-shuffled standard pack of 52 cards. What is the probability of drawing a heart or an ace?

- (A) $\frac{17}{52}$ (B) $\frac{4}{13}$
(C) $\frac{15}{52}$ (D) $\frac{9}{13}$

18. 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	6	17	8	5

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

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 distance between (1, -2) and (7, 6) is 11 units.

Reason (R): The distance between (x_1, y_1) and (x_2, y_2) is $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$.

20. Assertion (A): The sum of the zeroes of $x^2 - 29x - 252$ is 30.

Reason (R): For $ax^2 + bx + c$, the sum of the zeroes is $-b/a$.

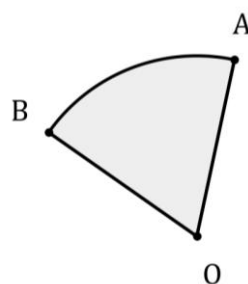
SECTION B

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

21. For an acute angle θ , $\cot \theta = \frac{7}{10}$. Evaluate $\frac{(1+\sin \theta)(1-\sin \theta)}{(1+\cos \theta)(1-\cos \theta)}$.

22. Two fair dice, one red and one blue, are thrown together. Find the probability that (i) the sum is 7 or 11, and (ii) this event does not occur.

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



Diameter = 24 cm; arc AB = 14 cm

24. (A) Two tanks contain 280 litres and 440 litres of water. Find the greatest capacity of a container that measures either quantity an exact number of times.

OR

(B) The HCF of 168 and 294 is written as $8m - 8$. Find m .

25. (A) In $\triangle ABC$, D is on AB and E on AC , with $DE \parallel BC$. Given $AD = 9$ cm, $DB = 13$ cm and $AE = 27$ cm, find the full length AC .

OR

(B) In $\triangle PQR$, S lies on PQ and T on PR . Given $PS = 16$ cm, $SQ = 24$ cm, $PT = 32$ cm and $TR = 49$ cm, decide whether $ST \parallel QR$. Justify your answer.

SECTION C

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

26. Given that $\sqrt{2}$ is irrational, prove that $6 - 3\sqrt{2}$ is irrational.

27. (A) For an acute angle θ , $\tan \theta + \cot \theta = 8$. Find $\tan^2 \theta + \cot^2 \theta$ and $\tan^3 \theta + \cot^3 \theta$.

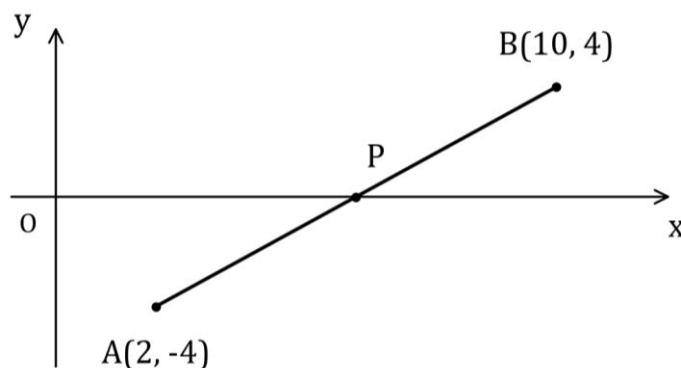
OR

(B) For an acute angle θ , $\operatorname{cosec} \theta - \cot \theta = \frac{1}{7}$. Find $\operatorname{cosec} \theta$ and $\cot \theta$.

28. Prove that the tangents at the endpoints of a diameter of a circle are parallel.

29. Find the monic quadratic polynomial whose zeroes have sum 8 and product -9. If its zeroes are α and β , also find $\alpha^2 + \beta^2$.

30. Using the coordinate diagram, in what ratio does the x -axis divide the segment joining $A(2, -4)$ and $B(10, 4)$? Also find the point of division.



31. (A) The sum of the first 17 terms of an AP is 527, and its fourth term is 16. Find its twentieth term.

OR

(B) Find the sum of all integers strictly between 15 and 200 that are divisible by 9.

SECTION D

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

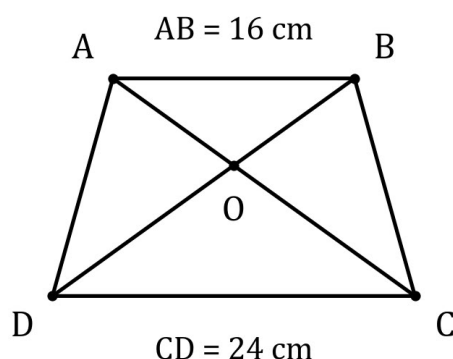
32. (A) Two points A and B lie on the same straight line with the foot O of a tower, with B between A and O. They are 20 m apart. The angles of elevation of the top are 30° at A and 60° at B. Find the height of the tower and BO. Give exact values.

OR

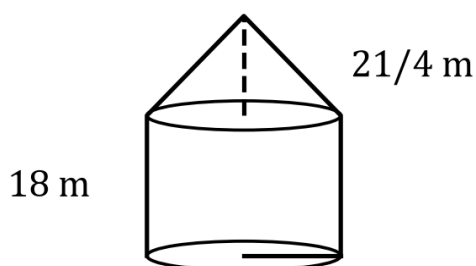
(B) From a window 35 m above level ground, the angles of elevation of the top and depression of the foot of a building across a street are 60° and 45° . Find the street width and the height of that building. Give exact values.

33. Two taps fill a large tank together in 12 hours. The larger tap alone takes 18 hours less than the smaller tap alone. Find the time taken by each tap to fill the tank separately.

34. Using the figure, in trapezium ABCD, $AB \parallel CD$, $AB = 16$ cm and $CD = 24$ cm. Diagonals AC and BD intersect at O, with $AC = 80$ cm and $BD = 80$ cm. Prove that $\triangle AOB \sim \triangle COD$, and find AO, OC, BO and OD.



35. (A) A tent has a cylindrical lower part of radius 7 m and height 18 m, with a conical roof of height $\frac{21}{4}$ m. Its base is open. Find the canvas needed, allowing an additional 15 m^2 for stitching, and its cost at ₹9 per m^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 $\frac{7}{2}$ cm, the total length is $\frac{73}{3}$ cm, and each cone is $\frac{14}{3}$ cm high. Find the volume of air inside and the total outer surface area. Neglect sheet thickness and give exact values.

SECTION E

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

36. Tiwari Academy records the scores of 52 students in a mathematics quiz. The grouped frequency distribution is given below. The classes are continuous, with the upper endpoint excluded from each class.

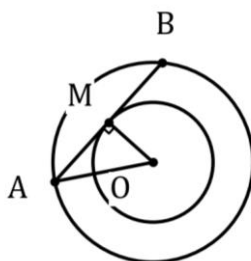
Score	0-10	10-20	20-30	30-40	40-50
Students	4	8	10	21	9

- (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 circular garden has two concentric boundaries with centre O and radii 30 m and 18 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 24 m from O. Find its length.

38. A taxi operator charges a fixed starting fee and a constant fare per kilometre. A 5 km journey costs ₹75 and an 8 km journey costs ₹102. Let the starting fee be ₹x and the fare per kilometre be ₹y.

- (i) Write the equation for the 5 km journey.
- (ii) Write the equation for the 8 km journey.
- (iii) (A) Find the starting fee and the fare per kilometre.

OR

- (iii) (B) Find the cost of a 12 km journey.