

Mathematics Standard

Sample Question Paper 2

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 11 m casts a shadow of length 11 m on level ground. The angle of elevation of the Sun is:

- (A) 30° (B) 45°
(C) 60° (D) 90°

2. The HCF of 14 and 21 is:

- (A) 8 (B) 7
(C) 14 (D) 21

3. A bag contains 4 red, 7 blue and 3 green balls. One ball is drawn at random. The probability that it is not blue is:

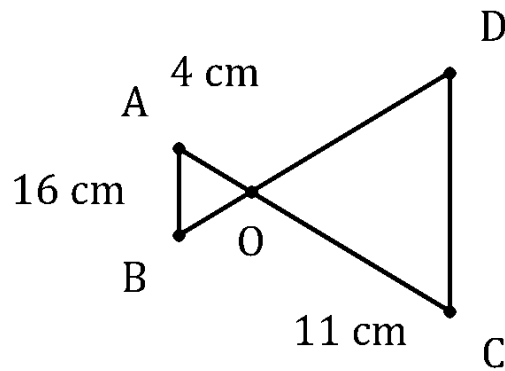
- (A) $\frac{1}{2}$ (B) 0
(C) 1 (D) $\frac{2}{7}$

4. 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	4	6	13	8	5

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

5. In the figure, $AB \parallel CD$ and AC and BD intersect at O . $AO = 4$ cm, $OC = 11$ cm and $AB = 16$ cm. CD is:

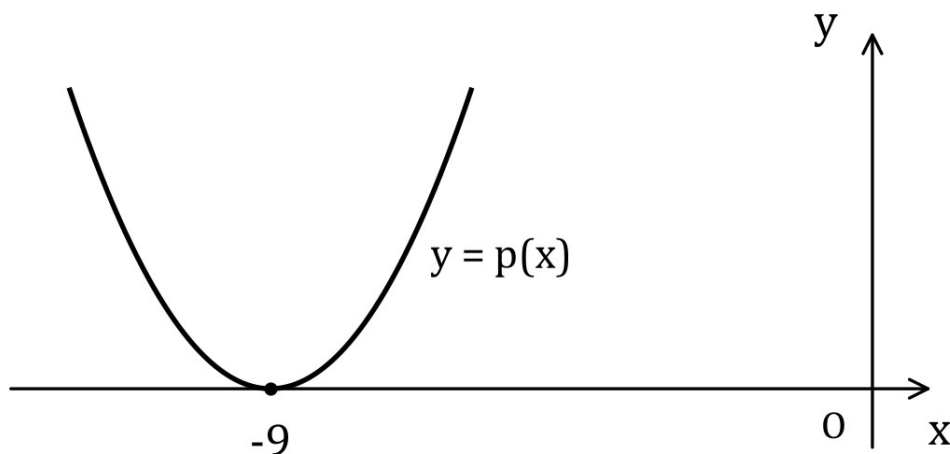


- (A) 44 cm (B) 48 cm
(C) 40 cm (D) 45 cm

6. If $x - y = -1$ and $x + y = 5$, then (x, y) equals:

- (A) (3, 2) (B) (-2, 3)
(C) (2, -3) (D) (2, 3)

7. The graph of the quadratic polynomial $p(x)$ touches the x -axis at the point marked below. Its two zeroes, counting multiplicity, are:

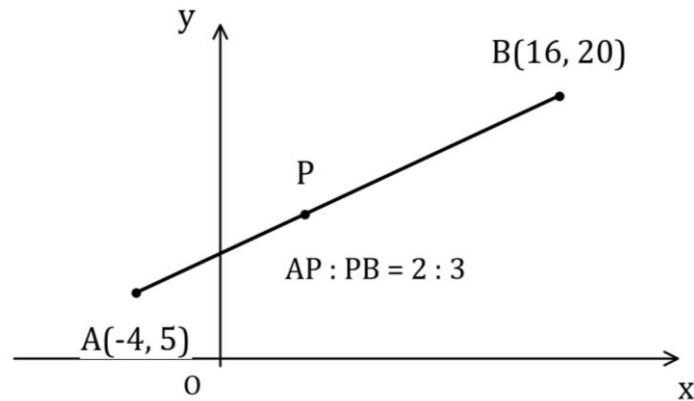


- (A) -10, -8
(B) -9, -8
(C) -9, -9
(D) -10, -9

8. For a distribution, mean = 26 and median = 29. The estimated mode using the empirical relation is:

- (A) 38 (B) 32
(C) 35 (D) 55

9. Using the coordinate diagram, p divides A(-4, 5) and B(16, 20) internally in the ratio 2 : 3. P is:



- (A) (4, 11) (B) (5, 11)
(C) (4, 12) (D) (3, 10)

10. The value of $5\sec^2\theta - 5\tan^2\theta$, where defined, is:

- (A) 0 (B) 1
(C) 5 (D) 10

11. The distance between A(-7, -7) and B(-3, -2) is:

- (A) $\sqrt{45}$ units (B) 9 units
(C) 1 units (D) $\sqrt{41}$ units

12. One card is drawn from a well-shuffled standard pack of 52 cards. What is the probability of drawing a red ace?

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

13. The zeroes of $3x^2 + 9x + c$ are reciprocal to each other. The value of c is:

- (A) 3 (B) -3
(C) 6 (D) 4

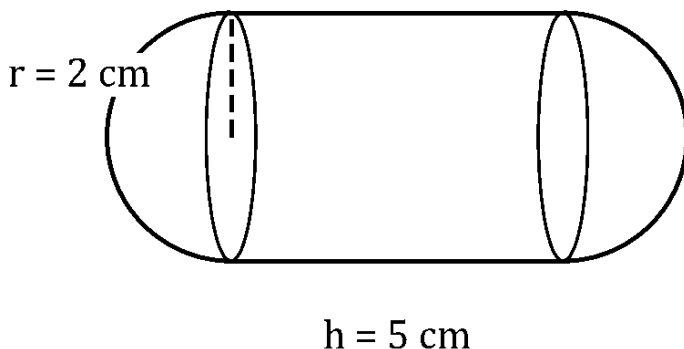
14. A wheel of diameter 14 cm travels $\frac{33}{50}$ km. Its number of complete revolutions is:

- (A) 150 (B) 15000
(C) 2000 (D) 1500

15. Which term of the AP -3, 0, 3, ... is 33?

- (A) 14 (B) 13
(C) 12 (D) 15

16. The solid shown is described as follows. A capsule has a cylindrical middle of radius 2 cm and length 5 cm, with a hemisphere of radius 2 cm at each end. Its total length is:



- (A) 7 cm
- (B) 5 cm
- (C) 12 cm
- (D) 9 cm

17. A card is drawn at random from cards numbered 1 to 32. The probability of a perfect-square number is:

- | | |
|--------------------|---------------------|
| (A) $\frac{3}{16}$ | (B) $\frac{5}{32}$ |
| (C) $\frac{1}{8}$ | (D) $\frac{27}{32}$ |

18. A circle has radius 28 cm. Find the length of the arc subtending 30° at its centre.

- | | |
|-----------------------|-----------------------|
| (A) $\frac{44}{3}$ cm | (B) $\frac{22}{3}$ cm |
| (C) $\frac{88}{3}$ cm | (D) $\frac{65}{3}$ 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 distance between $(-3, 2)$ and $(6, 14)$ is 16 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 $x^2 - 29x - 96$ is 30.

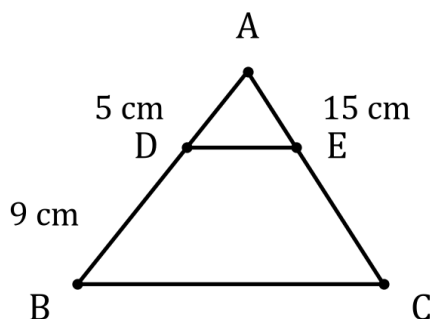
Reason (R): For $ax^2 + bx + c$, the sum of the zeroes is $-b/a$.

SECTION B

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

21. For an acute angle θ , $\cot \theta = \frac{1}{2}$. Evaluate $\frac{(1+\sin \theta)(1-\sin \theta)}{(1+\cos \theta)(1-\cos \theta)}$.

22. (A) In the figure, D lies on AB and E on AC, with $DE \parallel BC$. $AD = 5$ cm, $DB = 9$ cm and $AE = 15$ cm. Find the full length AC.



OR

(B) In ΔPQR , S lies on PQ and T on PR. Given $PS = 8$ cm, $SQ = 12$ cm, $PT = 16$ cm and $TR = 25$ cm, decide whether $ST \parallel QR$. Justify your answer.

23. Two fair dice, one red and one blue, are thrown together. Find the probability that (i) the two numbers are equal, and (ii) this event does not occur.

24. A sector belongs to a circle of diameter 16 cm. Its corresponding arc is 6 cm long. Find the area of the sector.

25. (A) Two tanks contain 140 litres and 220 litres of water. Find the greatest capacity of a container that measures either quantity an exact number of times.

OR

(B) The HCF of 72 and 126 is written as $4m - 4$. Find m.

SECTION C

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

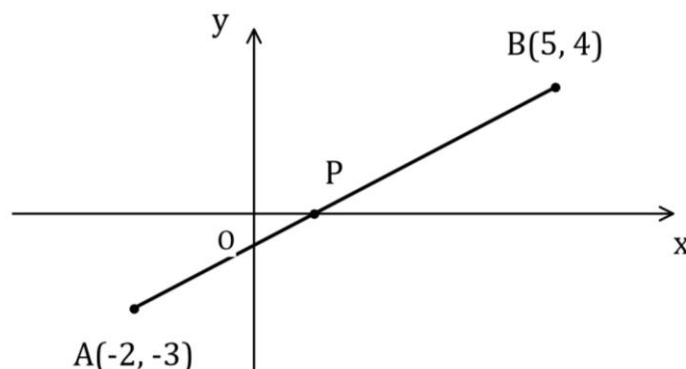
26. Given that $\sqrt{3}$ is irrational, prove that $2 - 3\sqrt{3}$ is irrational.

27. (A) The sum of the fifth and ninth terms of an AP is 42; the sum of its seventh and twelfth terms is 57. Find the AP.

OR

(B) Find the sum of all integers strictly between 11 and 160 that are divisible by 5.

28. Using the coordinate diagram, in what ratio does the x-axis divide the segment joining A(-2, -3) and B(5, 4)? Also find the point of division.



29. Find the monic quadratic polynomial whose zeroes have sum 4 and product -5. If its zeroes are α and β , also find $\alpha^2 + \beta^2$.

30. Prove that a quadrilateral circumscribing a circle has equal sums of opposite sides.

31. (A) For an acute angle θ , $6\sin^2\theta + 3\cos^2\theta = \frac{15}{4}$. Find $\sin^2\theta$, $\tan \theta$ and $\sec \theta$.

OR

(B) For an acute angle θ , $\operatorname{cosec} \theta - \cot \theta = \frac{1}{3}$. Find $\operatorname{cosec} \theta$ and $\cot \theta$.

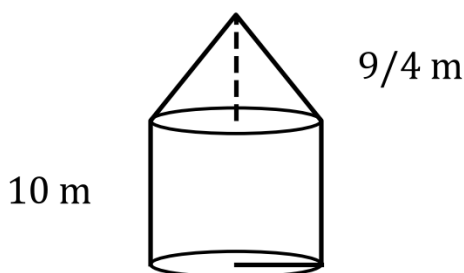
SECTION D

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

32. In $\triangle ABC$, points D and E lie on AB and AC respectively. AD = 5 cm, DB = 7 cm, AE = 10 cm, EC = 14 cm and BC = 24 cm. Prove that $DE \parallel BC$ and $\triangle ADE \sim \triangle ABC$. Find DE and the perimeter of $\triangle ADE$.

33. A fast train takes 2 hours less than a slow train to travel 175 km. The slow train travels 10 km/h slower than the fast train. Find both speeds.

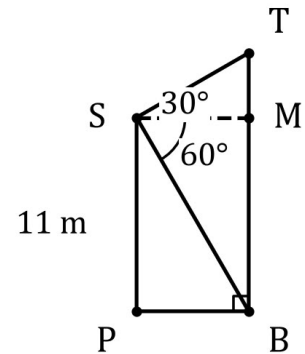
34. (A) A tent has a cylindrical lower part of radius 3 m and height 10 m, with a conical roof of height $\frac{9}{4}$ m. Its base is open. Find the canvas needed, allowing an additional 11 m^2 for stitching, and its cost at ₹5 per m^2 . Give exact values.



OR

(B) A closed thin-sheet model consists of a cylinder with a cone attached at each end. The common radius is $\frac{3}{2}$ cm, the total length is 11 cm, and each cone is 2 cm high. Find the volume of air inside and the total outer surface area. Neglect sheet thickness and give exact values.

35. (A) S is a point on a roof 11 m above level ground. The top T and foot B of a vertical tower are seen from S at angles of elevation 30° and depression 60° respectively. With SM horizontal, find the horizontal distance PB and tower height BT in exact form.



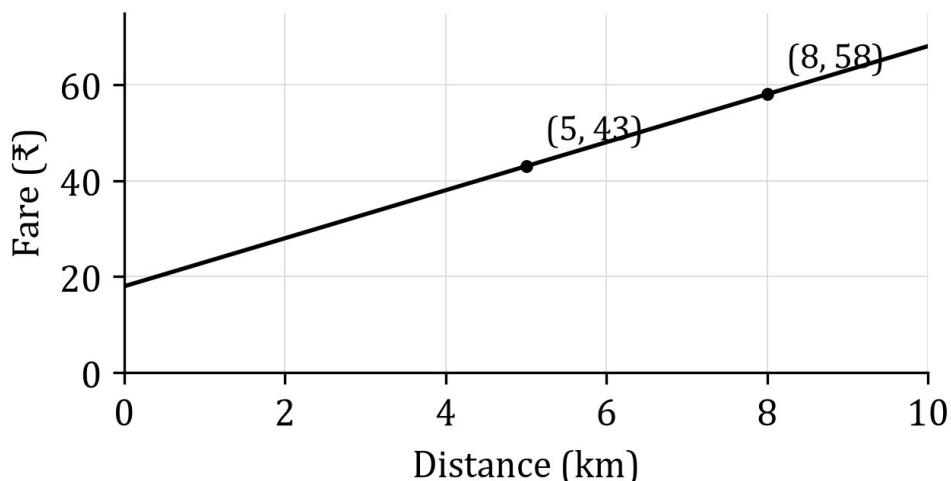
OR

(B) From a window 23 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.

SECTION E

Questions 36 to 38 carry 4 marks each. ($3 \times 4 = 12$); subparts (i), (ii), (iii): 1, 1, 2 marks.

36. A taxi operator charges a fixed starting fee and a constant fare per kilometre. A 5 km journey costs ₹43 and an 8 km journey costs ₹58. Let the starting fee be ₹x and the fare per kilometre be ₹y. The accompanying graph represents these data.



- (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.

37. A designer draws two tangents PA and PB to a circle with centre O. The radius is 4 cm and $OP = 8$ cm. The segment OP lies inside $\angle APB$.

(i) Find $\angle OAP$.

(ii) Find PA in exact form.

(iii) (A) Find $\angle APB$ and $\angle AOB$.

OR

(iii) (B) Find the perimeter of $\triangle APB$ in exact form.

38. Tiwari Academy records the scores of 48 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	7	11	17	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.