

Mathematics Standard

Sample Question Paper 4

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. 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	3	8	15	10	5

(A) 20–30 minutes

(B) 0–10 minutes

(C) 10–20 minutes

(D) 30–40 minutes

2. Two runners take 11 minutes and 13 minutes to complete one lap. Starting together, after how many minutes will both next be at the starting point together?

(A) 144

(B) 1

(C) 286

(D) 143

3. For $x^2 + px + 25 = 0$ to have equal roots, p must be:

(A) ± 10

(B) 5

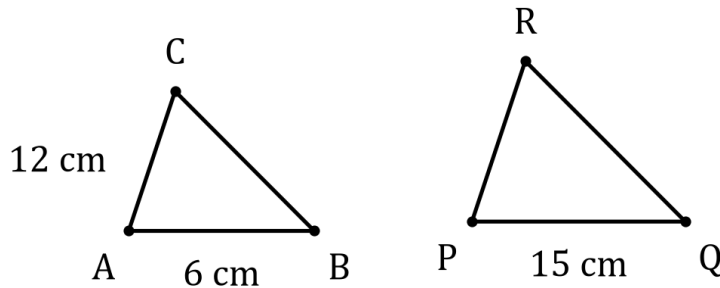
(C) -5

(D) 0

4. P divides A(-2, 3) and B(16, 9) internally in the ratio 1 : 2. P is:

- (A) (5, 5) (B) (4, 6)
(C) (4, 5) (D) (3, 4)

5. The figure shows $\triangle ABC \sim \triangle PQR$, with $A \leftrightarrow P$, $B \leftrightarrow Q$ and $C \leftrightarrow R$. $AB = 6$ cm, $PQ = 15$ cm and $AC = 12$ cm. PR is:



- (A) 32 cm (B) 28 cm
(C) 30 cm (D) 31 cm

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

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

7. Which term of the AP 1, 6, 11, ... is 71?

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

8. For a distribution, mean = 28 and median = 31. The estimated mode using the empirical relation is:

- (A) 37 (B) 40
(C) 34 (D) 59

9. A bag contains 6 red, 9 blue and 2 green balls. One ball is drawn at random. The probability that it is not blue is:

- (A) 0 (B) 1
(C) $\frac{8}{17}$ (D) $\frac{6}{17}$

10. The zeroes of $5x^2 + 15x + c$ are reciprocal to each other. The value of c is:

- (A) -5 (B) 10
(C) 5 (D) 6

11. A card is drawn at random from cards numbered 1 to 36. The probability of a perfect-square number is:

(A) $\frac{7}{36}$

(B) $\frac{5}{36}$

(C) $\frac{5}{6}$

(D) $\frac{1}{6}$

12. The value of $7\sec^2\theta - 7\tan^2\theta$, where defined, is:

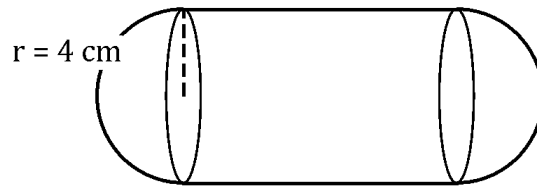
(A) 7

(B) 0

(C) 1

(D) 14

13. The solid shown is described as follows. A capsule has a cylindrical middle of radius 4 cm and length 7 cm, with a hemisphere of radius 4 cm at each end. Its total length is:



(A) 11 cm

(B) 15 cm

(C) 7 cm

(D) 18 cm

14. A circle has radius 42 cm. Find the length of the arc subtending 60° at its centre.

(A) 22 cm

(B) 88 cm

(C) 44 cm

(D) 51 cm

15. A tower of height 13 m casts a shadow of length 13 m on level ground. The angle of elevation of the Sun is:

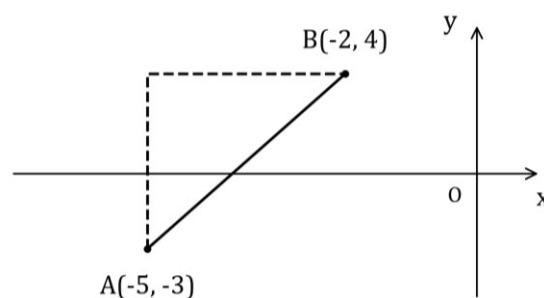
(A) 30°

(B) 60°

(C) 90°

(D) 45°

16. Using the coordinate diagram, the distance between A(-5, -3) and B(-2, 4) is:



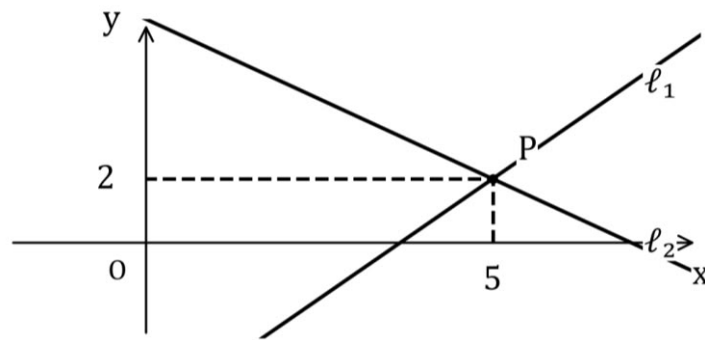
(A) $\sqrt{62}$ units

(B) $\sqrt{58}$ units

(C) 10 units

(D) 4 units

17. The graphs of two linear equations ℓ_1 and ℓ_2 intersect at P. Using the marked projections, their solution (x, y) is:



- (A) $(-5, 2)$ (B) $(5, -2)$
 (C) $(-5, -2)$ (D) $(5, 2)$

18. A wheel of diameter 28 cm travels $\frac{11}{5}$ km. Its number of complete revolutions is:

- (A) 250 (B) 2500
 (C) 25000 (D) 3000

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 sum of the zeroes of $x^2 - 29x - 170$ is 30.

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

20. Assertion (A): The distance between $(-1, 0)$ and $(14, 20)$ is 26 units.

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

SECTION B

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

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

22. A sector belongs to a circle of diameter 20 cm. Its corresponding arc is 10 cm long. Find the area of the sector.

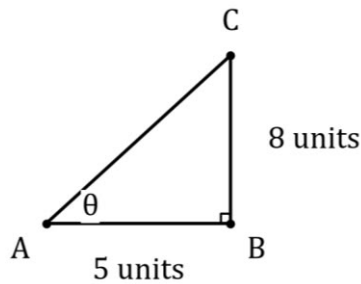
23. (A) In $\triangle ABC$, D is on AB and E on AC, with $DE \parallel BC$. Given $AD = 7$ cm, $DB = 11$ cm and $AE = 21$ cm, find the full length AC.

OR

(B) In ΔPQR , S lies on PQ and T on PR. Given PS = 12 cm, SQ = 18 cm, PT = 24 cm and TR = 37 cm, decide whether ST $\parallel$ QR. Justify your answer.

24. In the right triangle shown, AB = 5 units, BC = 8 units and $\angle A = \theta$.

Evaluate $\frac{(1+\sin \theta)(1-\sin \theta)}{(1+\cos \theta)(1-\cos \theta)}$.



25. (A) Two tanks contain 210 litres and 330 litres of water. Find the greatest capacity of a container that measures either quantity an exact number of times.

OR

(B) The HCF of 120 and 210 is written as $6m - 6$. Find m.

SECTION C

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

26. Find the monic quadratic polynomial whose zeroes have sum 6 and product -7. If its zeroes are α and β , also find $\alpha^2 + \beta^2$.

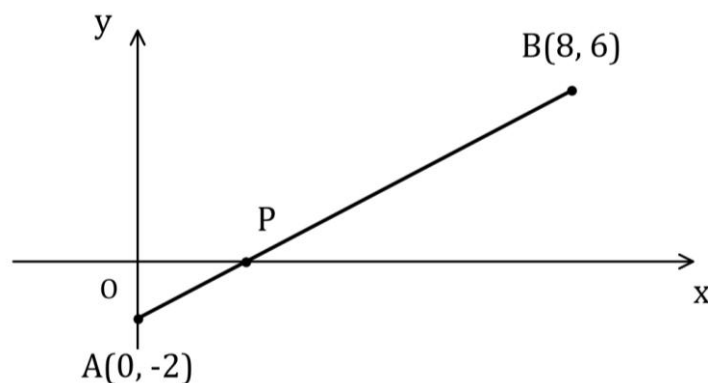
27. (A) For an acute angle θ , $\sec \theta + \tan \theta = 6$. Find $\cos \theta$, $\sin \theta$ and $\tan \theta$.

OR

(B) For an acute angle θ , $\operatorname{cosec} \theta - \cot \theta = \frac{1}{5}$. Find $\operatorname{cosec} \theta$ and $\cot \theta$.

28. Given that $\sqrt{7}$ is irrational, prove that $4 - 5\sqrt{7}$ is irrational.

29. Using the coordinate diagram, in what ratio does the x-axis divide the segment joining A(0, -2) and B(8, 6)? Also find the point of division.



30. A quadrilateral ABCD circumscribes a circle. $AB = 15$ cm, $BC = 20$ cm and $CD = 25$ cm. Find AD and its perimeter, explaining the tangent property used.

31. (A) The sum of the first n terms of an AP is $S_n = 4n^2 + 6n$. Find its n th term and its 15th term.

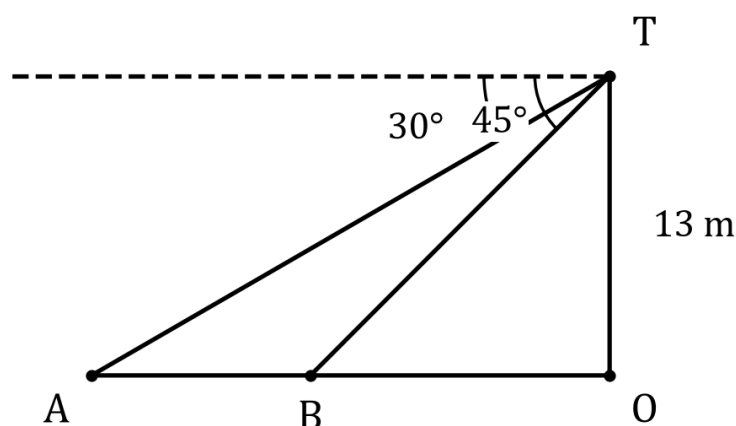
OR

(B) Find the sum of all integers strictly between 13 and 180 that are divisible by 7.

SECTION D

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

32. (A) From the top T of a 13 m vertical tower, two cars A and B on the same side of its foot O are seen at angles of depression 30° and 45° . The points are in the order A, B, O. Use the figure to find AO, BO and the distance AB in exact form.



OR

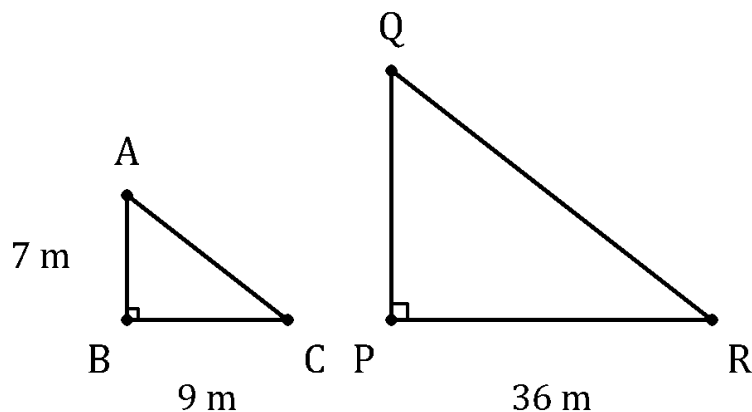
(B) From a window 29 m above level ground, the angles of elevation of the top and depression of the foot of a building across a street are 60° and 45° . Find the street width and the height of that building. Give exact values.

33. (A) A tent has a cylindrical lower part of radius 5 m and height 14 m, with a conical roof of height $\frac{15}{4}$ m. Its base is open. Find the canvas needed, allowing an additional 13 m^2 for stitching, and its cost at ₹7 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 $\frac{5}{2}$ cm, the total length is $\frac{53}{3}$ cm, and each cone is $\frac{10}{3}$ cm high. Find the volume of air inside and the total outer surface area. Neglect sheet thickness and give exact values.

34. Using the figure, a vertical pole 7 m tall casts a shadow 9 m long. At the same time, a vertical tower casts a shadow 36 m long on level ground. Prove that the two height-and-shadow triangles are similar and find the tower height. Later, the tower shadow is 45 m long. Find the pole shadow at that later time.



35. A rectangular lawn measures 46 m by 36 m. A rectangular pond is built in its centre, leaving a uniform-width grass strip along all four edges. The grass strip has area 720 m^2 . Find its width and the pond dimensions.

SECTION E

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

36. A taxi operator charges a fixed starting fee and a constant fare per kilometre. A 5 km journey costs ₹59 and an 8 km journey costs ₹80. 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.

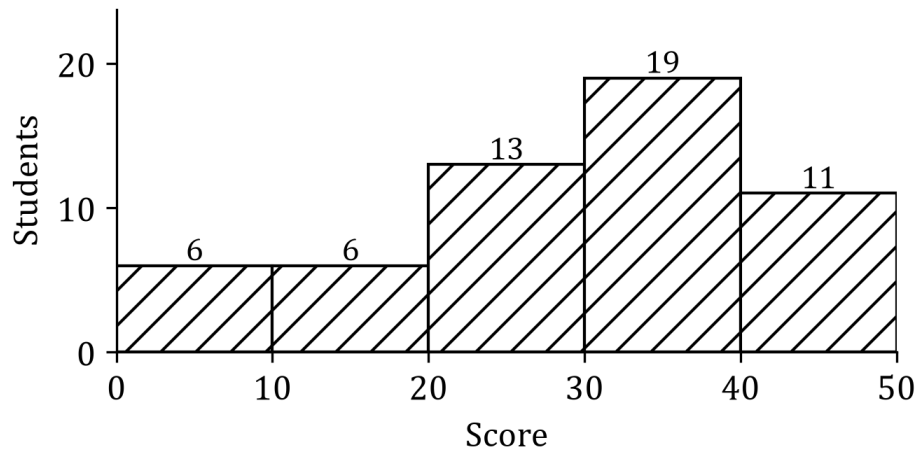
37. Two straight paths PA and PB touch a circular park at A and B. Its centre is O, its radius is 20 m and $OP = 52 \text{ m}$.

- (i) Find $\angle OAP$.
- (ii) Find PA.
- (iii) (A) Find the perimeter of quadrilateral OAPB.

OR

- (iii) (B) Find the area of quadrilateral OAPB.

38. Tiwari Academy records the scores of 55 students in a mathematics quiz. The histogram gives the grouped frequency distribution. The classes are continuous, with the upper endpoint excluded from each class.



- (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.