

Mathematics Standard

Sample Question Paper 10

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. ($20 \times 1 = 20$)

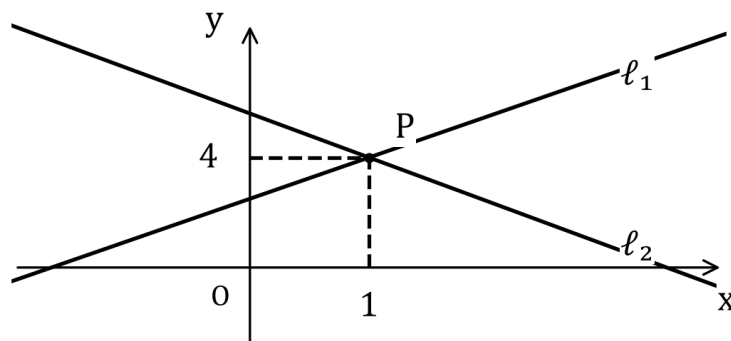
1. Which term of the AP 13, 19, 25, ... is 133?

- (A) 22 (B) 21
(C) 20 (D) 23

2. Two runners take 17 minutes and 19 minutes to complete one lap. Starting together, after how many minutes will both next be at the starting point together?

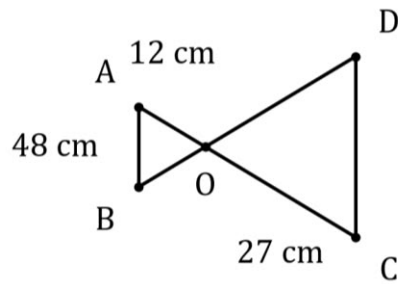
- (A) 324 (B) 323
(C) 1 (D) 646

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



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

4. In the figure, $AB \parallel CD$ and AC and BD intersect at O . $AO = 12$ cm, $OC = 27$ cm and $AB = 48$ cm. CD is:



- (A) 108 cm
(B) 112 cm
(C) 104 cm
(D) 109 cm

5. A card is drawn at random from cards numbered 1 to 48. The probability of a perfect-square number is:

- (A) $\frac{7}{48}$
(B) $\frac{1}{8}$
(C) $\frac{5}{48}$
(D) $\frac{7}{8}$

6. The value of $13\sec^2\theta - 13\tan^2\theta$, where defined, is:

- (A) 0
(B) 1
(C) 13
(D) 26

7. A tower of height 19 m casts a shadow of length 19 m on level ground. The angle of elevation of the Sun is:

- (A) 30°
(B) 45°
(C) 60°
(D) 90°

8. The distance between $A(1, 9)$ and $B(4, 14)$ is:

- (A) $\sqrt{38}$ units
(B) 8 units
(C) 2 units
(D) $\sqrt{34}$ units

9. One card is drawn from a well-shuffled standard pack of 52 cards. What is the probability of drawing a red numbered card from 2 to 10?

- (A) $\frac{19}{52}$
(B) $\frac{9}{26}$
(C) $\frac{17}{52}$
(D) $\frac{17}{26}$

10. For $x^2 + px + 121 = 0$ to have equal roots, p must be:

- (A) 11
(B) -11
(C) ± 22
(D) 0

11. A wheel of diameter 70 cm travels $\frac{121}{10}$ km. Its number of complete revolutions is:

(A) 550

(B) 55000

(C) 6000

(D) 5500

12. A circle has radius 84 cm. Find the length of the arc subtending 150° at its centre.

(A) 220 cm

(B) 110 cm

(C) 440 cm

(D) 227 cm

13. A bag contains 12 red, 10 blue and 2 green balls. One ball is drawn at random. The probability that it is not blue is:

(A) $\frac{7}{12}$

(B) 0

(C) 1

(D) $\frac{1}{2}$

14. 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	6	21	8	5

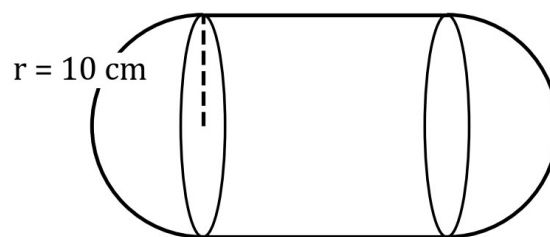
(A) 0-10 minutes

(B) 10-20 minutes

(C) 20-30 minutes

(D) 30-40 minutes

15. The solid shown is described as follows. A capsule has a cylindrical middle of radius 10 cm and length 13 cm, with a hemisphere of radius 10 cm at each end. Its total length is:



$h = 13$ cm

(A) 23 cm

(B) 13 cm

(C) 36 cm

(D) 33 cm

16. For a distribution, mean = 34 and median = 37. The estimated mode using the empirical relation is:

(A) 46

(B) 40

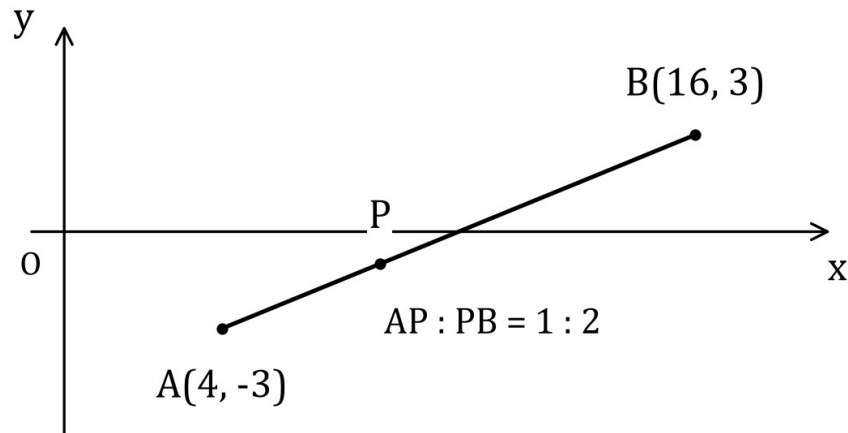
(C) 43

(D) 71

17. The zeroes of $11x^2 + 33x + c$ are reciprocal to each other. The value of c is:

- (A) 11 (B) -11
(C) 22 (D) 12

18. Using the coordinate diagram, p divides $A(4, -3)$ and $B(16, 3)$ internally in the ratio $1 : 2$. P is:



- (A) (8, -1) (B) (9, -1)
(C) (8, 0) (D) (7, -2)

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 $(5, -6)$ and $(23, 18)$ is 31 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 $x^2 - 29x - 440$ 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. ($5 \times 2 = 10$)

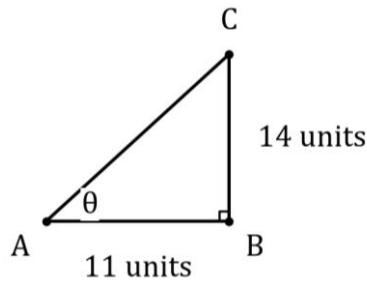
21. (A) Two tanks contain 420 litres and 660 litres of water. Find the greatest capacity of a container that measures either quantity an exact number of times.

OR

(B) The HCF of 264 and 462 is written as $12m - 12$. Find m .

22. In the right triangle shown, $AB = 11$ units, $BC = 14$ units and $\angle A = \theta$.

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



23. A sector belongs to a circle of diameter 32 cm. Its corresponding arc is 22 cm long. Find the area of the sector.

24. (A) In $\triangle ABC$, D is on AB and E on AC, with $DE \parallel BC$. Given $AD = 13$ cm, $DB = 17$ cm and $AE = 39$ cm, find the full length AC.

OR

(B) In $\triangle PQR$, S lies on PQ and T on PR. Given $PS = 24$ cm, $SQ = 36$ cm, $PT = 48$ cm and $TR = 73$ cm, decide whether $ST \parallel QR$. Justify your answer.

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

SECTION C

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

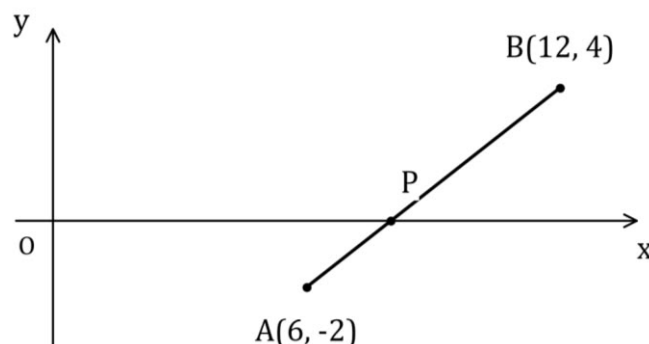
26. (A) The sum of the first n terms of an AP is $S_n = 10n^2 + 12n$. Find its n th term and its 21th term.

OR

(B) Find the sum of all integers strictly between 19 and 240 that are divisible by 6.

27. Find the monic quadratic polynomial whose zeroes have sum 12 and product -13. If its zeroes are α and β , also find $\alpha^2 + \beta^2$.

28. Using the coordinate diagram, in what ratio does the x-axis divide the segment joining $A(6, -2)$ and $B(12, 4)$? Also find the point of division.



29. A quadrilateral ABCD circumscribes a circle. AB = 33 cm, BC = 44 cm and CD = 55 cm. Find AD and its perimeter, explaining the tangent property used.

30. (A) For an acute angle θ , $\sec \theta + \tan \theta = 12$. Find $\cos \theta$, $\sin \theta$ and $\tan \theta$.

OR

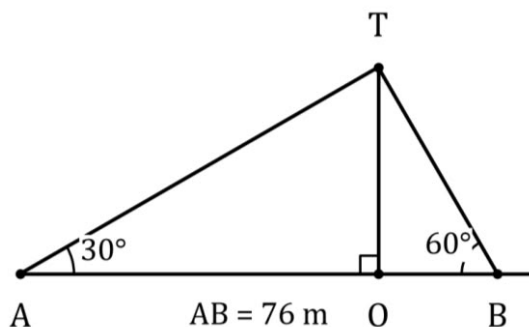
(B) For an acute angle θ , $\operatorname{cosec} \theta - \cot \theta = \frac{1}{11}$. Find $\operatorname{cosec} \theta$ and $\cot \theta$.

31. Given that $\sqrt{11}$ is irrational, prove that $10 - 3\sqrt{11}$ is irrational.

SECTION D

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

32. (A) A and B lie on opposite sides of a vertical tower OT on level ground. AB = 76 m. The angles of elevation of T at A and B are 30° and 60° respectively, as shown. Find OT, AO and BO in exact form.



OR

(B) From a window 47 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.

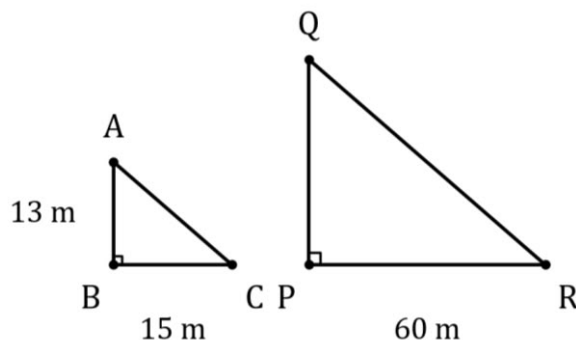
33. (A) A tent has a cylindrical lower part of radius 11 m and height 26 m, with a conical roof of height $\frac{33}{4}$ m. Its base is open. Find the canvas needed, allowing an additional 19 m^2 for stitching, and its cost at ₹13 per m^2 . Give exact values.

OR

(B) A closed thin-sheet model consists of a cylinder with a cone attached at each end. The common radius is $\frac{11}{2}$ cm, the total length is $\frac{113}{3}$ cm, and each cone is $\frac{22}{3}$ cm high. Find the volume of air inside and the total outer surface area. Neglect sheet thickness and give exact values.

34. The sum of the areas of two squares is 637 cm^2 . Their perimeters differ by 28 cm. Find their side lengths and areas.

35. Using the figure, a vertical pole 13 m tall casts a shadow 15 m long. At the same time, a vertical tower casts a shadow 60 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 75 m long. Find the pole shadow at that later time.



SECTION E

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

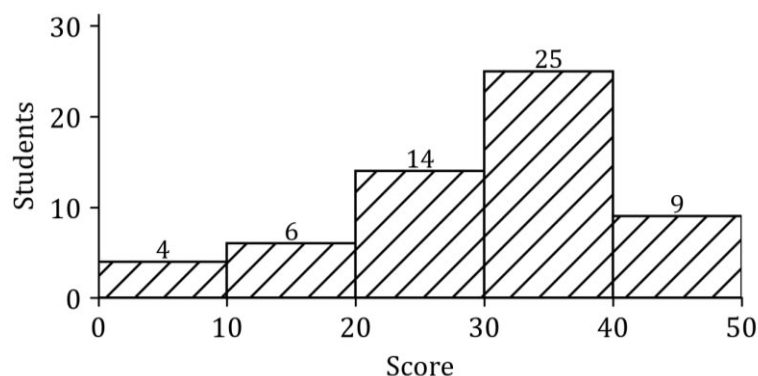
36. A taxi operator charges a fixed starting fee and a constant fare per kilometre. A 5 km journey costs ₹107 and an 8 km journey costs ₹146. Let the starting fee be ₹ x and the fare per kilometre be ₹ y .

- (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. Tiwari Academy records the scores of 58 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.

38. Two straight paths PA and PB touch a circular park at A and B. Its centre is O, its radius is 50 m and $OP = 130$ 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.