

Mathematics Standard
Sample Question Paper 14
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.

SECTION A

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

1. If $x - y = -1$ and $x + y = 29$, then (x, y) equals:

- (A) (15, 14) (B) (-14, 15)
(C) (14, -15) (D) (14, 15)

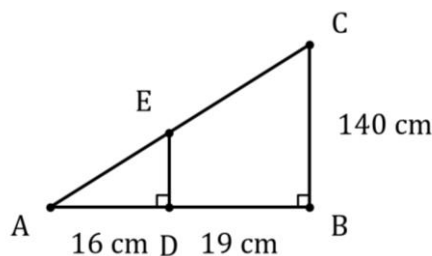
2. The distance between A(5, 17) and B(9, 22) is:

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

3. A wheel of diameter 98 cm travels $\frac{231}{10}$ km. Its number of complete revolutions is:

- (A) 750 (B) 75000
(C) 8000 (D) 7500

4. In the figure, AD = 16 cm, DB = 19 cm and BC = 140 cm. DE and BC are perpendicular to AB. The length DE is:



- (A) 64 cm (B) 68 cm
(C) 60 cm (D) 65 cm

5. The value of $17\sec^2\theta - 17\tan^2\theta$, where defined, is:

- (A) 0 (B) 1
(C) 17 (D) 34

6. For a distribution, mean = 38 and median = 41. The estimated mode using the empirical relation is:

- (A) 50 (B) 44
(C) 47 (D) 79

7. The zeroes of $15x^2 + 45x + c$ are reciprocal to each other. The value of c is:

- (A) 15 (B) -15
(C) 30 (D) 16

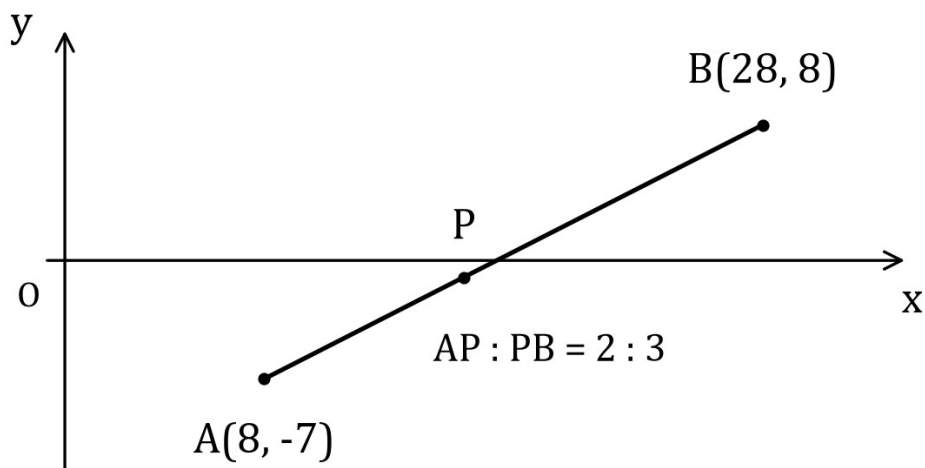
8. A card is drawn at random from cards numbered 1 to 56. The probability of a perfect-square number is:

- (A) $\frac{1}{7}$ (B) $\frac{1}{8}$
(C) $\frac{3}{28}$ (D) $\frac{7}{8}$

9. Which term of the AP 21, 26, 31, ... is 141?

- (A) 26 (B) 25
(C) 24 (D) 27

10. Using the coordinate diagram, p divides $A(8, -7)$ and $B(28, 8)$ internally in the ratio 2 : 3. P is:



- (A) (16, -1) (B) (17, -1)
(C) (16, 0) (D) (15, -2)

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

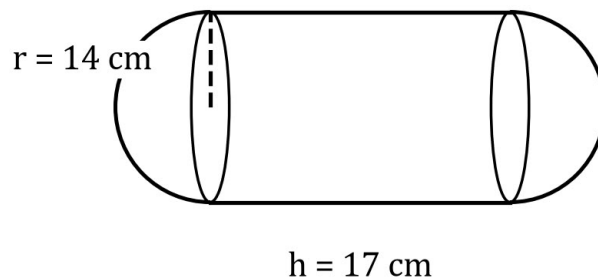
Minutes	0-10	10-20	20-30	30-40	40-50
Students	4	6	25	8	5

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

12. A circle has radius 112 cm. Find the length of the arc subtending 210° at its centre.

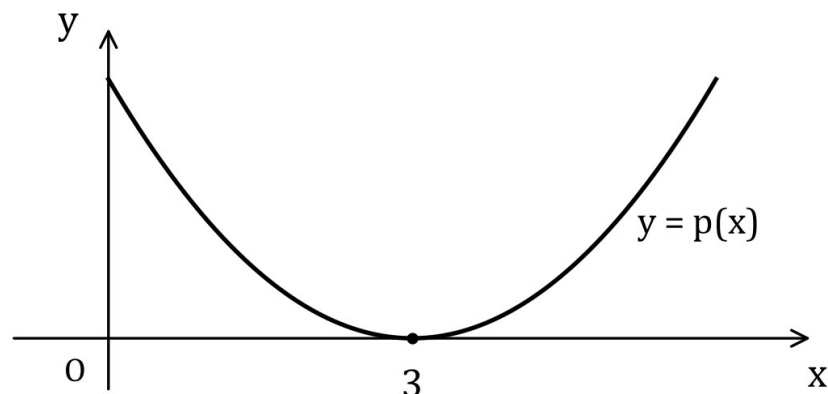
- (A) $\frac{1232}{3}$ cm
(B) $\frac{616}{3}$ cm
(C) $\frac{2464}{3}$ cm
(D) $\frac{1253}{3}$ cm

13. The solid shown is described as follows. A capsule has a cylindrical middle of radius 14 cm and length 17 cm, with a hemisphere of radius 14 cm at each end. Its total length is:



- (A) 31 cm
(B) 17 cm
(C) 48 cm
(D) 45 cm

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



- (A) 2, 4
(B) 3, 4
(C) 3, 3
(D) 2, 3

15. A tower of height 23 m casts a shadow of length 23 m on level ground. The angle of elevation of the Sun is:

- (A) 30° (B) 45°
(C) 60° (D) 90°

16. A bag contains 16 red, 9 blue and 3 green balls. One ball is drawn at random. The probability that it is not blue is:

- (A) $\frac{19}{28}$ (B) 0
(C) 1 (D) $\frac{4}{7}$

17. The HCF of 38 and 57 is:

- (A) 20 (B) 19
(C) 38 (D) 57

18. One card is drawn from a well-shuffled standard pack of 52 cards. What is the probability of drawing neither an ace nor a king?

- (A) $\frac{45}{52}$ (B) $\frac{11}{13}$
(C) $\frac{43}{52}$ (D) $\frac{2}{13}$

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 (9, -10) and (24, 10) is 26 units.

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

20. Assertion (A): The sum of the zeroes of $x^2 - 29x - 660$ 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. ($5 \times 2 = 10$)

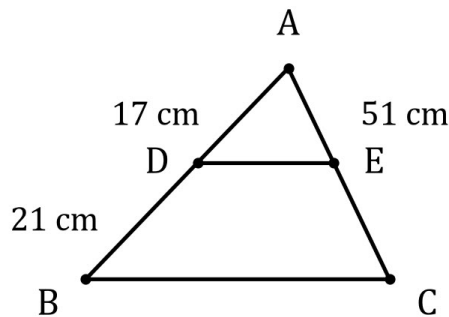
21. (A) Two tanks contain 560 litres and 880 litres of water. Find the greatest capacity of a container that measures either quantity an exact number of times.

OR

(B) The HCF of 360 and 630 is written as $16m - 16$. Find m.

22. A sector belongs to a circle of diameter 40 cm. Its corresponding arc is 30 cm long. Find the area of the sector.

23. (A) In the figure, D lies on AB and E on AC, with $DE \parallel BC$. $AD = 17$ cm, $DB = 21$ cm and $AE = 51$ cm. Find the full length AC.



OR

(B) In ΔPQR , S lies on PQ and T on PR. Given $PS = 32$ cm, $SQ = 48$ cm, $PT = 64$ cm and $TR = 97$ cm, decide whether $ST \parallel QR$. Justify your answer.

24. For an acute angle θ , $\cot \theta = \frac{5}{6}$. Evaluate $\frac{(1+\sin \theta)(1-\sin \theta)}{(1+\cos \theta)(1-\cos \theta)}$.

25. Two fair dice, one red and one blue, are thrown together. Find the probability that (i) the smaller of the two numbers is 3, and (ii) this event does not occur.

SECTION C

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

26. Given that $\sqrt{7}$ is irrational, prove that $14 - 3\sqrt{7}$ is irrational.

27. The incircle of a right triangle ABC touches AB, AC and BC at F, E and D respectively. $AB = 45$ cm, $AC = 60$ cm and $BC = 75$ cm. Find AF, BD and CD.

28. (A) The sum of the fifth and ninth terms of an AP is 66; the sum of its seventh and twelfth terms is 81. Find the AP.

OR

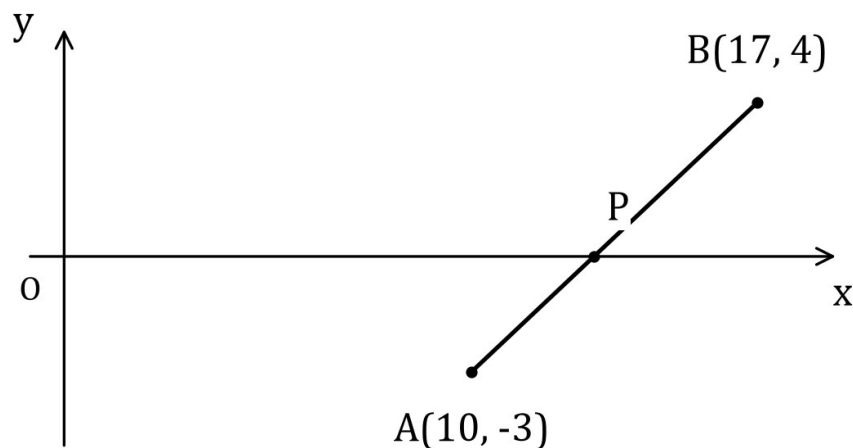
(B) Find the sum of all integers strictly between 23 and 280 that are divisible by 10.

29. (A) For an acute angle θ , $18\sin^2\theta + 15\cos^2\theta = \frac{63}{4}$. Find $\sin^2\theta$, $\tan \theta$ and $\sec \theta$.

OR

(B) For an acute angle θ , $\operatorname{cosec} \theta - \cot \theta = \frac{1}{15}$. Find $\operatorname{cosec} \theta$ and $\cot \theta$.

30. Using the coordinate diagram, in what ratio does the x-axis divide the segment joining A(10, -3) and B(17, 4)? Also find the point of division.



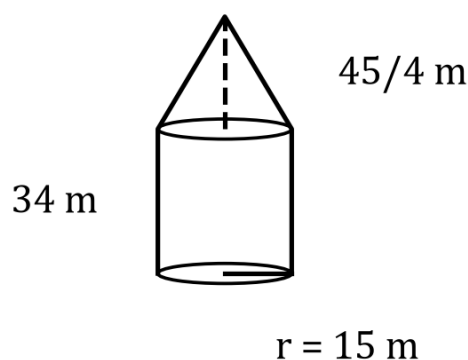
31. Find the monic quadratic polynomial whose zeroes have sum 16 and product -17. If its zeroes are α and β , also find $\alpha^2 + \beta^2$.

SECTION D

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

32. A rectangular lawn measures 66 m by 56 m. A rectangular pond is built in its centre, leaving a uniform-width grass strip along all four edges. The grass strip has area 1120 m^2 . Find its width and the pond dimensions.

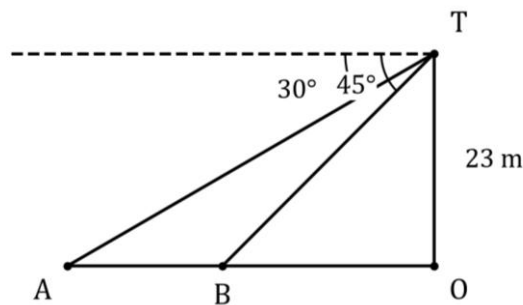
33. (A) A tent has a cylindrical lower part of radius 15 m and height 34 m, with a conical roof of height $\frac{45}{4}$ m. Its base is open. Find the canvas needed, allowing an additional 23 m^2 for stitching, and its cost at ₹17 per m^2 . Give exact values.



OR

(B) A closed thin-sheet model consists of a cylinder with a cone attached at each end. The common radius is $\frac{15}{2}$ cm, the total length is 51 cm, and each cone is 10 cm high. Find the volume of air inside and the total outer surface area. Neglect sheet thickness and give exact values.

34. (A) From the top T of a 23 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 59 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.

35. In $\triangle ABC$, points D and E lie on AB and AC respectively. $AD = 17$ cm, $DB = 19$ cm, $AE = 34$ cm, $EC = 38$ cm and $BC = 72$ cm. Prove that $DE \parallel BC$ and $\triangle ADE \sim \triangle ABC$. Find DE and the perimeter of $\triangle ADE$.

SECTION E

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

36. A designer draws two tangents PA and PB to a circle with centre O. The radius is 16 cm and $OP = 32$ cm. The segment OP lies inside $\angle APB$.

(i) Find $\angle OAP$.

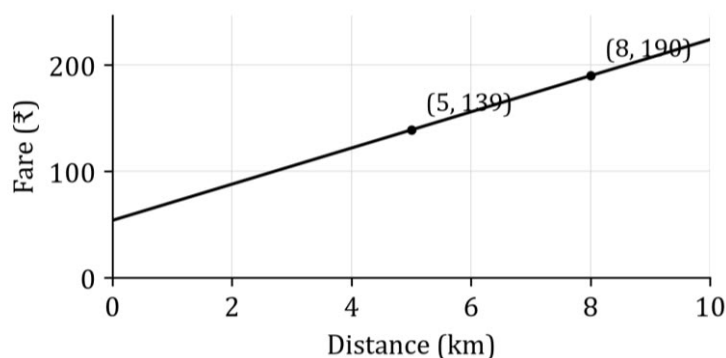
(ii) Find PA in exact form.

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

OR

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

37. A taxi operator charges a fixed starting fee and a constant fare per kilometre. A 5 km journey costs ₹139 and an 8 km journey costs ₹190. 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.

38. Tiwari Academy records the scores of 62 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	13	29	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.