

Mathematics Standard

Sample Question Paper 16

Class X | Code 041 | 2026-27

Time Allowed: 3 Hours

Maximum Marks: 80

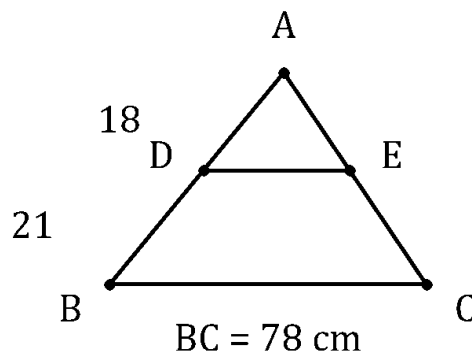
General Instructions

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

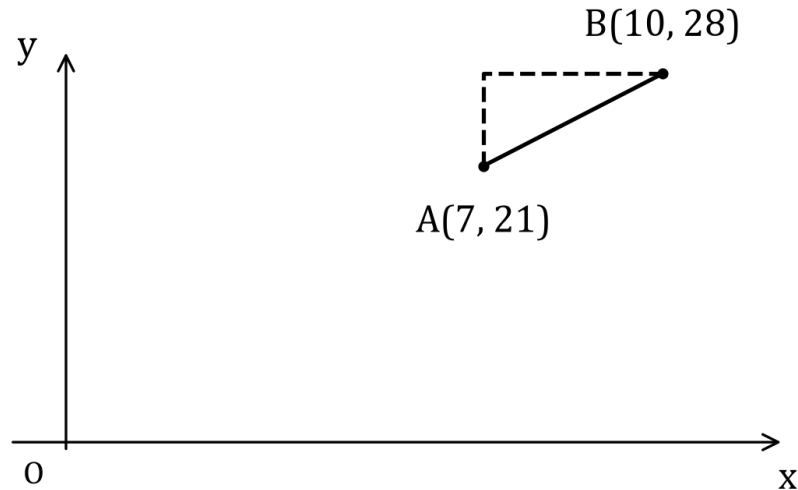
Questions 1 to 20 carry 1 mark each. ($20 \times 1 = 20$)

1. In the figure, $AD = 18$ cm, $DB = 21$ cm and $BC = 78$ cm. $DE \parallel BC$. The length DE is:



- (A) 38 cm
(B) 34 cm
(C) 36 cm
(D) 37 cm
2. A circle has radius 126 cm. Find the length of the arc subtending 240° at its centre.
(A) 264 cm
(B) 1056 cm
(C) 528 cm
(D) 535 cm
3. A tower of height 25 m casts a shadow of length 25 m on level ground. The angle of elevation of the Sun is:
(A) 30°
(B) 60°
(C) 90°
(D) 45°

4. Using the coordinate diagram, the distance between A(7, 21) and B(10, 28) is:



- (A) $\sqrt{62}$ units
(B) $\sqrt{58}$ units
(C) 10 units
(D) 4 units

5. For a distribution, mean = 40 and median = 43. The estimated mode using the empirical relation is:

- (A) 49
(B) 52
(C) 46
(D) 83

6. One card is drawn from a well-shuffled standard pack of 52 cards. What is the probability of drawing a black card that is not an ace?

- (A) $\frac{25}{52}$
(B) $\frac{23}{52}$
(C) $\frac{7}{13}$
(D) $\frac{6}{13}$

7. Which term of the AP 25, 27, 29, ... is 77?

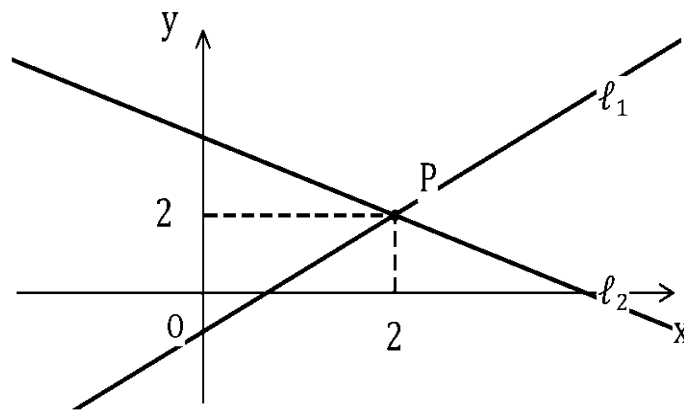
- (A) 28
(B) 26
(C) 29
(D) 27

8. 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	27	10	5

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

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



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

10. Two runners take 23 minutes and 25 minutes to complete one lap. Starting together, after how many minutes will both next be at the starting point together?

- (A) 576 (B) 1
(C) 1150 (D) 575

11. A wheel of diameter 112 cm travels $\frac{748}{25}$ km. Its number of complete revolutions is:

- (A) 850 (B) 8500
(C) 85000 (D) 9000

12. The value of $19\sec^2\theta - 19\tan^2\theta$, where defined, is:

- (A) 19 (B) 0
(C) 1 (D) 38

13. A bag contains 18 red, 6 blue and 2 green balls. One ball is drawn at random. The probability that it is not blue is:

- (A) 0 (B) 1
(C) $\frac{10}{13}$ (D) $\frac{9}{13}$

14. The zeroes of $17x^2 + 51x + c$ are reciprocal to each other. The value of c is:

- (A) -17 (B) 34
(C) 17 (D) 18

15. For $x^2 + px + 289 = 0$ to have equal roots, p must be:

- (A) ± 34 (B) 17
(C) -17 (D) 0

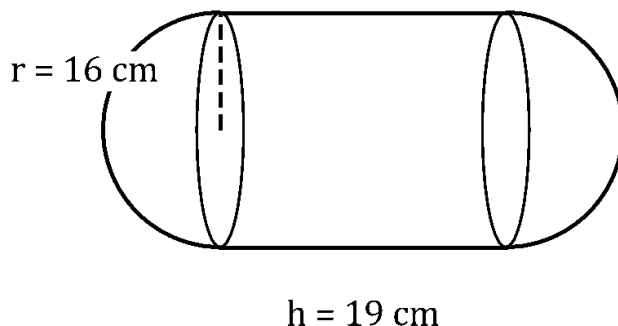
16. A card is drawn at random from cards numbered 1 to 60. The probability of a perfect-square number is:

- (A) $\frac{2}{15}$ (B) $\frac{1}{10}$
(C) $\frac{53}{60}$ (D) $\frac{7}{60}$

17. P divides A(10, -9) and B(28, -3) internally in the ratio 1 : 2. P is:

- (A) (17, -7) (B) (16, -6)
(C) (16, -7) (D) (15, -8)

18. The solid shown is described as follows. A capsule has a cylindrical middle of radius 16 cm and length 19 cm, with a hemisphere of radius 16 cm at each end. Its total length is:



- (A) 35 cm (B) 51 cm
(C) 19 cm (D) 54 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 (11, -12) and (17, -4) 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 $x^2 - 29x - 782$ 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 630 litres and 990 litres of water. Find the greatest capacity of a container that measures either quantity an exact number of times.

OR

(B) The HCF of 408 and 714 is written as $18m - 18$. Find m .

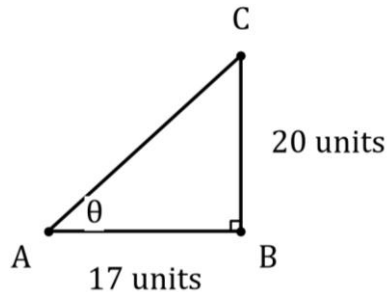
22. Two fair dice, one red and one blue, are thrown together. Find the probability that (i) the product is a multiple of 4, and (ii) this event does not occur.

23. (A) In $\triangle ABC$, D is on AB and E on AC , with $DE \parallel BC$. Given $AD = 19$ cm, $DB = 23$ cm and $AE = 57$ cm, find the full length AC .

OR

(B) In $\triangle PQR$, S lies on PQ and T on PR . Given $PS = 36$ cm, $SQ = 54$ cm, $PT = 72$ cm and $TR = 109$ cm, decide whether $ST \parallel QR$. Justify your answer.

24. In the right triangle shown, $AB = 17$ units, $BC = 20$ units and $\angle A = \theta$. Evaluate $\frac{(1+\sin \theta)(1-\sin \theta)}{(1+\cos \theta)(1-\cos \theta)}$.

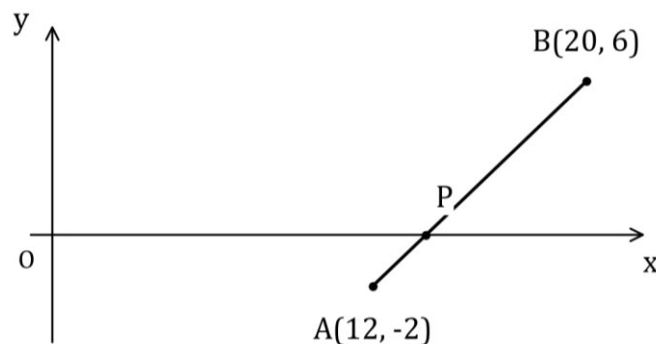


25. A sector belongs to a circle of diameter 44 cm. Its corresponding arc is 34 cm long. Find the area of the sector.

SECTION C

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

26. Using the coordinate diagram, in what ratio does the x -axis divide the segment joining $A(12, -2)$ and $B(20, 6)$? Also find the point of division.



27. (A) For an acute angle θ , $\sec \theta + \tan \theta = 18$. Find $\cos \theta$, $\sin \theta$ and $\tan \theta$.

OR

(B) For an acute angle θ , $\operatorname{cosec} \theta - \cot \theta = \frac{1}{17}$. Find $\operatorname{cosec} \theta$ and $\cot \theta$.

28. A quadrilateral ABCD circumscribes a circle. $AB = 51$ cm, $BC = 68$ cm and $CD = 85$ cm. Find AD and its perimeter, explaining the tangent property used.

29. Find the monic quadratic polynomial whose zeroes have sum 18 and product -19. If its zeroes are α and β , also find $\alpha^2 + \beta^2$.

30. (A) The sum of the first n terms of an AP is $S_n = 16n^2 + 18n$. Find its n th term and its 27th term.

OR

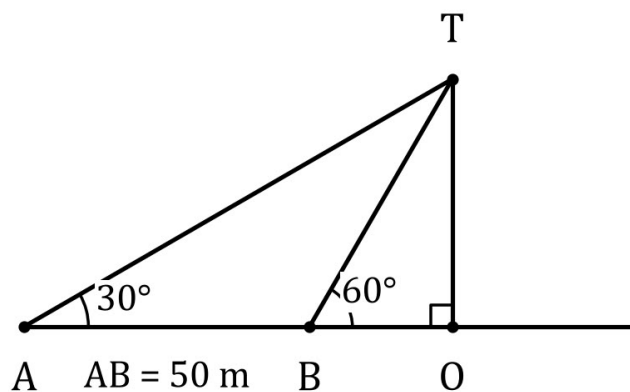
(B) Find the sum of all integers strictly between 25 and 300 that are divisible by 5.

31. Given that $\sqrt{2}$ is irrational, prove that $16 - 5\sqrt{2}$ is irrational.

SECTION D

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

32. (A) Points A, B and O lie in this order on level ground. OT is a vertical tower. $AB = 50$ m and the angles of elevation of T at A and B are 30° and 60° . Using the figure, find OT and BO in exact form.

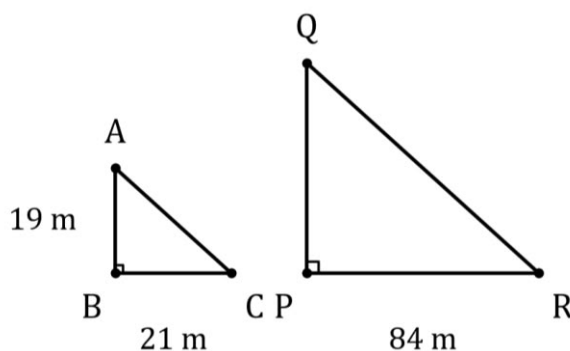


OR

(B) From a window 65 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 32 hours. The larger tap alone takes 48 hours less than the smaller tap alone. Find the time taken by each tap to fill the tank separately.

34. Using the figure, a vertical pole 19 m tall casts a shadow 21 m long. At the same time, a vertical tower casts a shadow 84 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 105 m long. Find the pole shadow at that later time.



35. (A) A tent has a cylindrical lower part of radius 17 m and height 38 m, with a conical roof of height $\frac{51}{4}$ m. Its base is open. Find the canvas needed, allowing an additional 25 m^2 for stitching, and its cost at ₹19 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 $\frac{17}{2}$ cm, the total length is $\frac{173}{3}$ cm, and each cone is $\frac{34}{3}$ 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. A taxi operator charges a fixed starting fee and a constant fare per kilometre. A 5 km journey costs ₹155 and an 8 km journey costs ₹212. Let the starting fee be ₹x and the fare per kilometre be ₹y.

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

OR

- (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 80 m and $OP = 208$ m.

(i) Find $\angle OAP$.

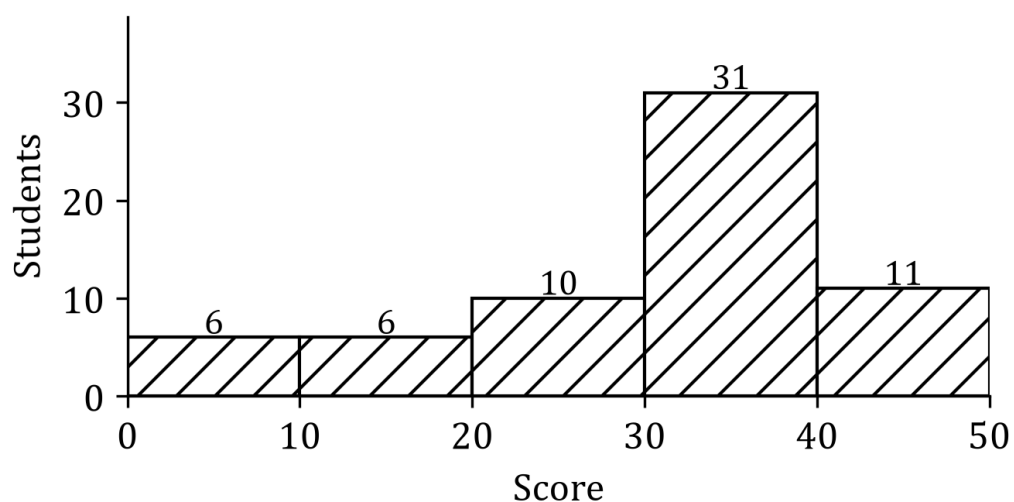
(ii) Find PA.

(iii) (A) Find the perimeter of quadrilateral OAPB.

OR

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

38. Tiwari Academy records the scores of 64 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.