

Mathematics Standard

Sample Question Paper 20

Class X | Code 041 | 2026-27

Time Allowed: 3 Hours

Maximum Marks: 80

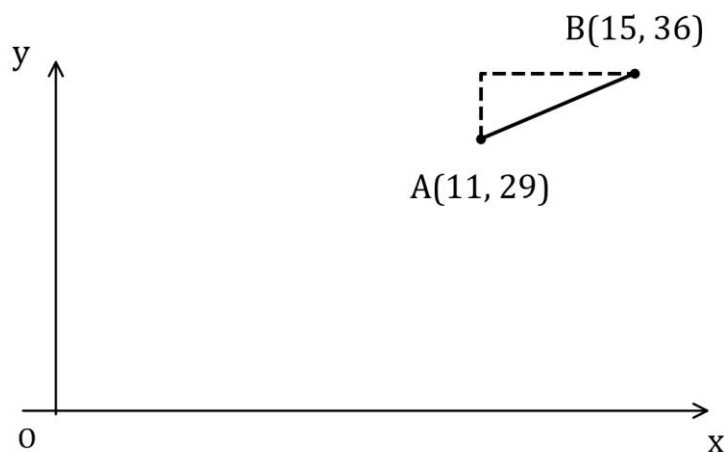
General Instructions

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. Using the coordinate diagram, the distance between A(11, 29) and B(15, 36) is:



- (A) $\sqrt{69}$ units
(C) 11 units

- (B) $\sqrt{65}$ units
(D) 3 units

2. A circle has radius 154 cm. Find the length of the arc subtending 300° at its centre.

- (A) $\frac{1210}{3}$ cm
(C) $\frac{2420}{3}$ cm

- (B) $\frac{4840}{3}$ cm
(D) $\frac{2441}{3}$ cm

3. The HCF of 50 and 75 is:

- (A) 26
(C) 75

- (B) 50
(D) 25

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	8	31	10	5

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

5. The value of $23\sec^2\theta - 23\tan^2\theta$, where defined, is:

- (A) 23 (B) 0
(C) 1 (D) 46

6. Which term of the AP 33, 39, 45, ... is 213?

- (A) 32 (B) 30
(C) 33 (D) 31

7. P divides A(14, -13) and B(44, 2) internally in the ratio 2 : 3. P is:

- (A) (27, -7) (B) (26, -6)
(C) (26, -7) (D) (25, -8)

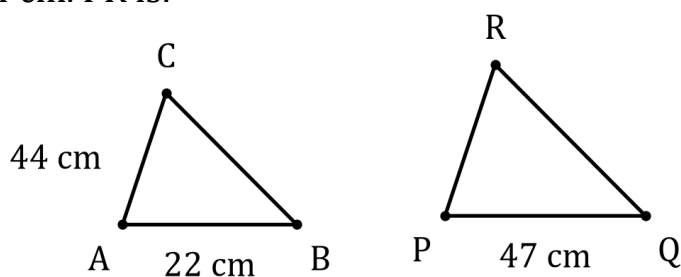
8. The zeroes of $21x^2 + 63x + c$ are reciprocal to each other. The value of c is:

- (A) -21 (B) 42
(C) 21 (D) 22

9. A wheel of diameter 140 cm travels $\frac{231}{5}$ km. Its number of complete revolutions is:

- (A) 1050 (B) 10500
(C) 105000 (D) 11000

10. The figure shows $\triangle ABC \sim \triangle PQR$, with $A \leftrightarrow P$, $B \leftrightarrow Q$ and $C \leftrightarrow R$. $AB = 22$ cm, $PQ = 47$ cm and $AC = 44$ cm. PR is:



- (A) 96 cm (B) 92 cm
(C) 94 cm (D) 95 cm

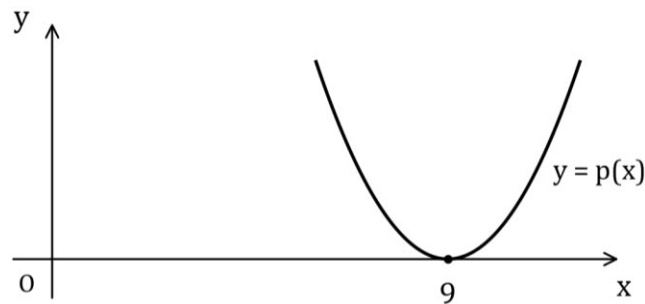
11. For a distribution, mean = 44 and median = 47. The estimated mode using the empirical relation is:

- (A) 53 (B) 56
(C) 50 (D) 91

12. If $x - y = -1$ and $x + y = 41$, then (x, y) equals:

- (A) (21, 20) (B) (20, 21)
(C) (-20, 21) (D) (20, -21)

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



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

14. A tower of height 29 m casts a shadow of length 29 m on level ground. The angle of elevation of the Sun is:

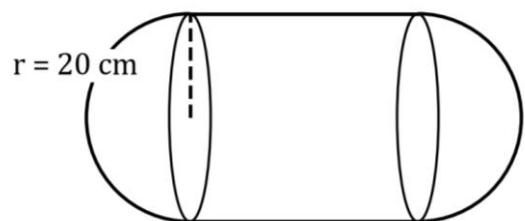
- (A) 30° (B) 60°
(C) 90° (D) 45°

15. One card is drawn from a well-shuffled standard pack of 52 cards. What is the probability of drawing a club numbered 4 or 9?

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

16. The solid shown is described as follows. A capsule has a cylindrical middle of radius 20 cm and length 23 cm, with a hemisphere of radius 20 cm at each end. Its total length is:

- (A) 43 cm
(B) 63 cm
(C) 23 cm
(D) 66 cm



17. A bag contains 22 red, 10 blue and 3 green balls. One ball is drawn at random. The probability that it is not blue is:

- (A) 0 (B) 1
(C) $\frac{5}{7}$ (D) $\frac{22}{35}$

18. A card is drawn at random from cards numbered 1 to 68. The probability of a perfect-square number is:

- (A) $\frac{9}{68}$ (B) $\frac{7}{68}$
(C) $\frac{15}{17}$ (D) $\frac{2}{17}$

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 (15, -16) and (33, 8) 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 $x^2 - 29x - 1050$ 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 sector belongs to a circle of diameter 52 cm. Its corresponding arc is 42 cm long. Find the area of the sector.

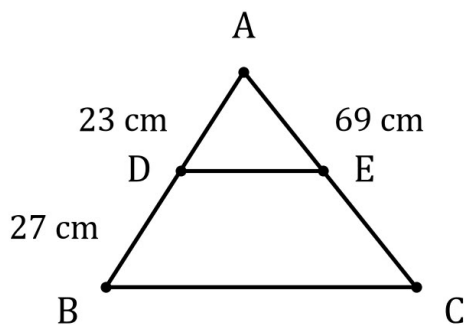
22. Two fair dice, one red and one blue, are thrown together. Find the probability that (i) the sum is a multiple of 3, and (ii) this event does not occur.

23. (A) Two tanks contain 770 litres and 1210 litres of water. Find the greatest capacity of a container that measures either quantity an exact number of times.

OR

(B) The HCF of 504 and 882 is written as $22m - 22$. Find m .

24. (A) In the figure, D lies on AB and E on AC, with $DE \parallel BC$. $AD = 23$ cm, $DB = 27$ cm and $AE = 69$ cm. Find the full length AC.



OR

(B) In ΔPQR , S lies on PQ and T on PR. Given $PS = 44$ cm, $SQ = 66$ cm, $PT = 88$ cm and $TR = 133$ cm, decide whether $ST \parallel QR$. Justify your answer.

25. For an acute angle θ , $\cot \theta = \frac{7}{8}$.

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

SECTION C

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

26. The incircle of a right triangle ABC touches AB, AC and BC at F, E and D respectively. $AB = 63$ cm, $AC = 84$ cm and $BC = 105$ cm. Find AF, BD and CD.

27. (A) For an acute angle θ , $24\sin^2\theta + 21\cos^2\theta = \frac{87}{4}$. Find $\sin^2\theta$, $\tan \theta$ and $\sec \theta$.

OR

(B) For an acute angle θ , $\operatorname{cosec} \theta - \cot \theta = \frac{1}{21}$. Find $\operatorname{cosec} \theta$ and $\cot \theta$.

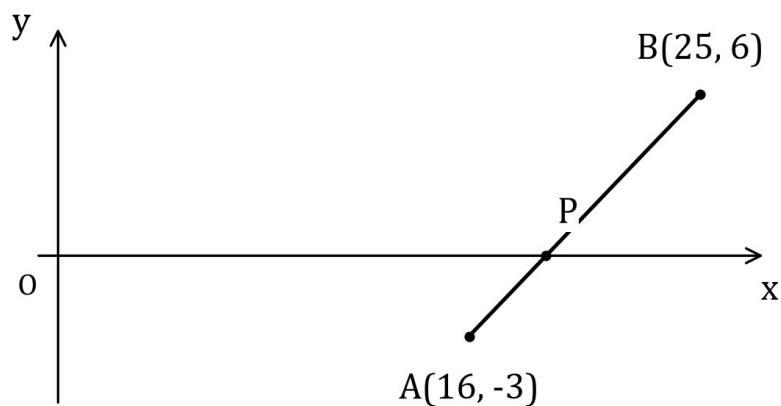
28. (A) The sum of the fifth and ninth terms of an AP is 102; the sum of its seventh and twelfth terms is 127. Find the AP.

OR

(B) Find the sum of all integers strictly between 29 and 340 that are divisible by 9.

29. Given that $\sqrt{11}$ is irrational, prove that $20 - 5\sqrt{11}$ is irrational.

30. Using the coordinate diagram, in what ratio does the x-axis divide the segment joining A(16, -3) and B(25, 6)? Also find the point of division.



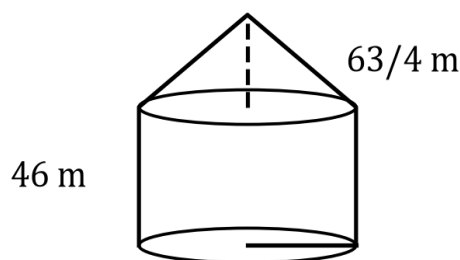
31. Find the monic quadratic polynomial whose zeroes have sum 22 and product -23. If its zeroes are α and β , also find $\alpha^2 + \beta^2$.

SECTION D

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

32. The sum of the areas of two squares is 1537 cm^2 . Their perimeters differ by 28 cm. Find their side lengths and areas.

33. (A) A tent has a cylindrical lower part of radius 21 m and height 46 m, with a conical roof of height $\frac{63}{4}$ m. Its base is open. Find the canvas needed, allowing an additional 29 m^2 for stitching, and its cost at ₹23 per m^2 . Give exact values.

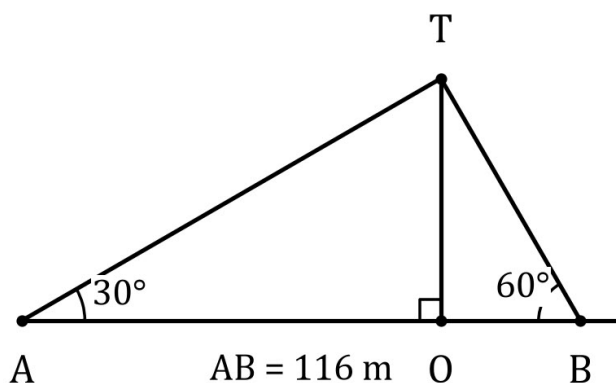


OR

(B) A closed thin-sheet model consists of a cylinder with a cone attached at each end. The common radius is $\frac{21}{2}$ cm, the total length is 71 cm, and each cone is 14 cm high. Find the volume of air inside and the total outer surface area. Neglect sheet thickness and give exact values.

34. In $\triangle ABC$, points D and E lie on AB and AC respectively. $AD = 23$ cm, $DB = 25$ cm, $AE = 46$ cm, $EC = 50$ cm and $BC = 96$ cm. Prove that $DE \parallel BC$ and $\triangle ADE \sim \triangle ABC$. Find DE and the perimeter of $\triangle ADE$.

35. (A) A and B lie on opposite sides of a vertical tower OT on level ground. $AB = 116$ 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 77 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. ($3 \times 4 = 12$)

36. Tiwari Academy's maths quiz scores are grouped below for 73 students. Class intervals are continuous, with the upper endpoint excluded.

Score	0-10	10-20	20-30	30-40	40-50
Students	6	7	14	35	11

- (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.

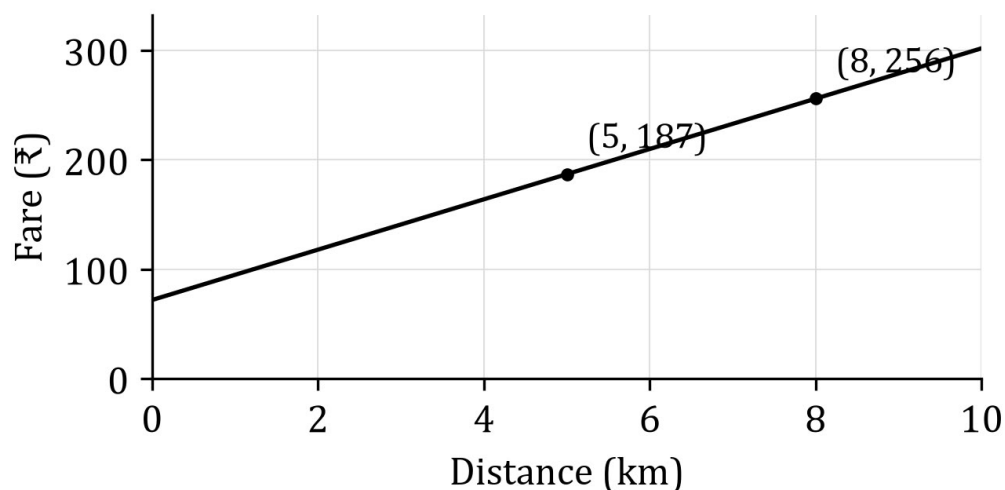
37. A designer draws two tangents PA and PB to a circle with centre O. The radius is 22 cm and $OP = 44$ cm. The segment OP lies inside $\angle APB$.

- (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. A taxi operator charges a fixed starting fee and a constant fare per kilometre. A 5 km journey costs ₹187 and an 8 km journey costs ₹256. 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.