

Mathematics Standard
Sample Question Paper 13
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 mean ages of men and women in a group are 52 and 36 years. The combined mean is 42 years. The percentage of women is:

- | | |
|---------|-----------|
| (A) 25% | (B) 62.5% |
| (C) 50% | (D) 75% |

2. A cone of radius 13 cm and height 13 cm is joined to a hemisphere of the same radius. The volume of the solid is:

- | | |
|----------------------------|--------------------------------------|
| (A) $4394\pi \text{ cm}^3$ | (B) $\frac{2197}{3}\pi \text{ cm}^3$ |
| (C) $2197\pi \text{ cm}^3$ | (D) $6591\pi \text{ cm}^3$ |

3. A card is drawn at random from cards numbered 1 to 54. The probability of a perfect-square number is:

- | | |
|--------------------|---------------------|
| (A) $\frac{7}{54}$ | (B) $\frac{4}{27}$ |
| (C) $\frac{1}{9}$ | (D) $\frac{47}{54}$ |

4. The distance between A(4, 15) and B(7, 19) is:

- | | |
|-----------------------|-------------|
| (A) $\sqrt{29}$ units | (B) 7 units |
| (C) $\sqrt{25}$ units | (D) 1 units |

5. The roots of $x^2 - 14x = 0$ are:

- (A) 0, -14 (B) 0, 14
(C) 14, -14 (D) 1, 14

6. In $\triangle ABC$, D lies on AB and E on AC; $DE \parallel BC$, $AD : DB = 2 : 3$ and $BC = 75$ cm. DE equals:

- (A) 31 cm (B) 32 cm
(C) 75 cm (D) 30 cm

7. For an acute angle θ , $\sin \theta = \frac{195}{197}$. Find $\cot \theta$.

- (A) $\frac{195}{28}$ (B) $\frac{28}{195}$
(C) $\frac{28}{197}$ (D) $\frac{197}{195}$

8. An arc has length 14π cm and its sector has area 119π cm². The radius is:

- (A) 34 cm (B) $\frac{17}{2}$ cm
(C) 17 cm (D) 19 cm

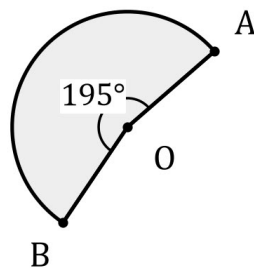
9. One card is drawn from a well-shuffled standard pack of 52 cards. What is the probability of drawing a spade numbered 2, 3, 5 or 7?

- (A) $\frac{1}{13}$ (B) $\frac{5}{52}$
(C) $\frac{3}{52}$ (D) $\frac{12}{13}$

10. If 14 is a zero of $x^2 + 5x + c$, then c equals:

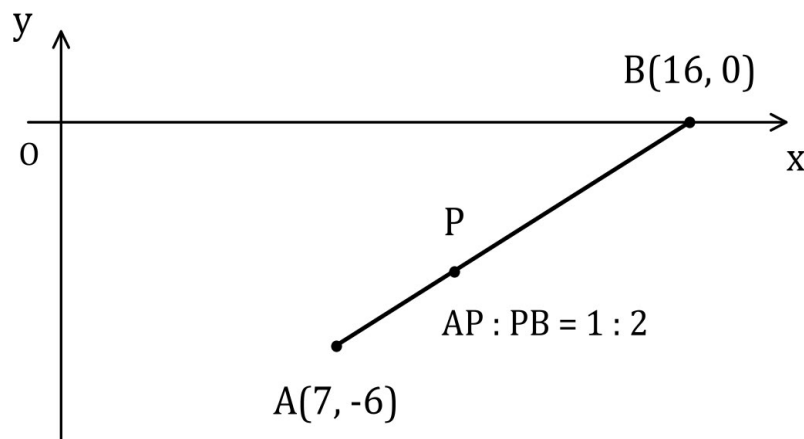
- (A) 266 (B) -252
(C) -280 (D) -266

11. In the sector diagram, a circle has radius 105 cm. Find the length of the arc subtending 195° at its centre.



- (A) $\frac{715}{4}$ cm (B) 715 cm
(C) $\frac{729}{2}$ cm (D) $\frac{715}{2}$ cm

12. Using the coordinate diagram, p divides A(7, -6) and B(16, 0) internally in the ratio 1 : 2. P is:



- (A) (11, -4) (B) (10, -3)
(C) (9, -5) (D) (10, -4)

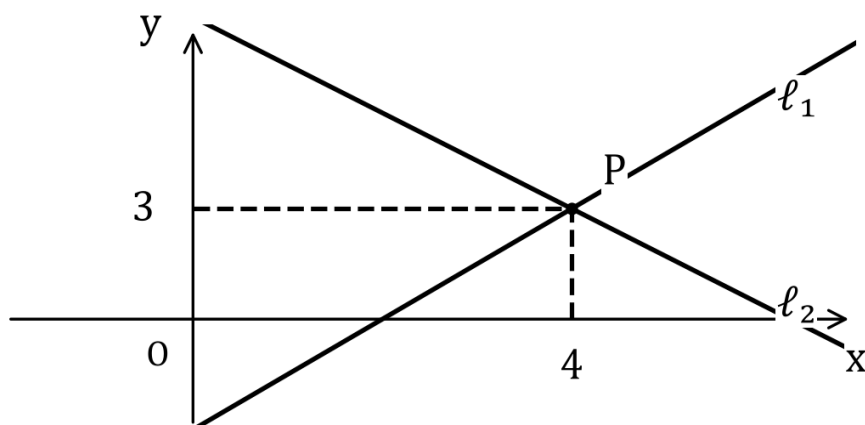
13. A bag contains 15 red, 8 blue and 2 green balls. One ball is drawn at random. The probability that it is not blue is:

- (A) 0 (B) 1
(C) $\frac{3}{5}$ (D) $\frac{17}{25}$

14. The 24th term of the AP 19, 23, 27, ... is:

- (A) 111 (B) 115
(C) 107 (D) 119

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



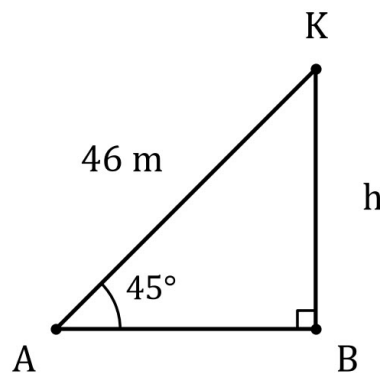
- (A) (4, 3) (B) (-4, 3)
(C) (4, -3) (D) (-4, -3)

16. 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	5	24	7	4

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

17. A kite is attached to a taut string of length 46 m, held at ground level. Using the angle shown, its height above the ground is:



- (A) 46 m
(B) 24 m
(C) $23\sqrt{2}$ m
(D) 22 m

18. Two runners take 20 minutes and 22 minutes to complete one lap. Starting together, after how many minutes will both next be at the starting point together?

- (A) 220
(B) 221
(C) 2
(D) 440

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 zeroes of $x^2 - 30x + 224$ are 14 and 16.

Reason (R): A real number a is a zero of $p(x)$ precisely when $p(a) = 0$.

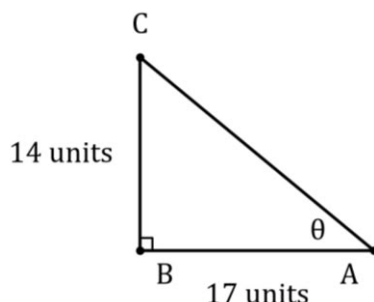
20. Assertion (A): If $A(12, -9)$ and $B(t, -5)$ lie on the circle with centre $O(8, -9)$, then $t = 8$.

Reason (R): The centre of a circle is the midpoint of every chord.

SECTION B

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

21. In the right triangle shown, $AB = 17$ units, $BC = 14$ units and $\angle A = \theta$. Find $\sin \theta$ and $\cos \theta$.



22. (A) Two tanks contain 525 litres and 825 litres of water. Find the greatest capacity of a container that measures either quantity an exact number of times.

OR

(B) The HCF of 336 and 588 is written as $15m - 15$. Find m .

23. (A) In $\triangle ABC$, D is on AB and E on AC , with $DE \parallel BC$. Given $AD = 16$ cm, $DB = 20$ cm and $AE = 48$ cm, find the full length AC .

OR

(B) In $\triangle PQR$, S lies on PQ and T on PR . Given $PS = 30$ cm, $SQ = 45$ cm, $PT = 60$ cm and $TR = 91$ cm, decide whether $ST \parallel QR$. Justify your answer.

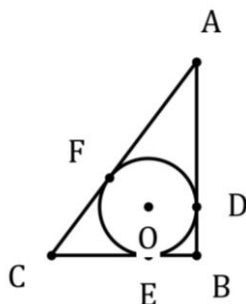
24. Two fair dice, one red and one blue, are thrown together. Find the probability that (i) the larger of the two numbers is 4, and (ii) this event does not occur.

25. A sector belongs to a circle of diameter 38 cm. Its corresponding arc is 28 cm long. Find the area of the sector.

SECTION C

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

26. The circle in the figure is inscribed in right triangle ABC and touches AB , BC and CA at D , E and F respectively. $AB = 60$ cm, $BC = 45$ cm and $AC = 75$ cm. Find AD , BE and CF .



27. Find the zeroes of $x^2 - x - 182$ and verify the relationships between its zeroes and coefficients.

28. Given that $\sqrt{5}$ is irrational, prove that $13 + 2\sqrt{5}$ is irrational.

29. (A) For an acute angle θ , $\sec \theta + \tan \theta = 15$. Find $\cos \theta$, $\sin \theta$ and $\tan \theta$.

OR

(B) For an acute angle θ , $\operatorname{cosec} \theta - \cot \theta = \frac{1}{14}$. Find $\operatorname{cosec} \theta$ and $\cot \theta$.

30. (A) The sum of the first n terms of an AP is $S_n = 13n^2 + 15n$. Find its n th term and its 24th term.

OR

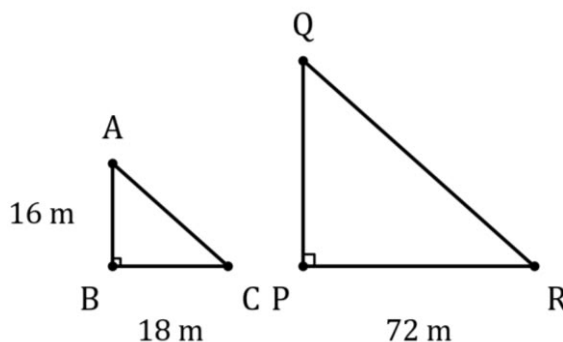
(B) Find the sum of all integers strictly between 22 and 270 that are divisible by 9.

31. Find the coordinates of the points of trisection of the segment joining $A(6, -8)$ and $B(12, 1)$.

SECTION D

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

32. Using the figure, a vertical pole 16 m tall casts a shadow 18 m long. At the same time, a vertical tower casts a shadow 72 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 90 m long. Find the pole shadow at that later time.



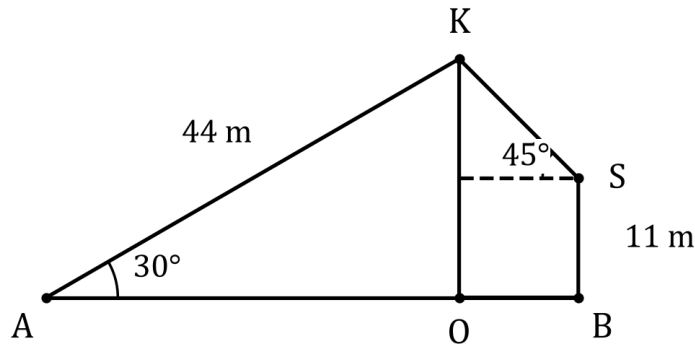
33. After the price of a book is reduced by ₹5, a customer can buy 5 more books for ₹6000. Find the original price and the original number of books the customer could buy.

34. (A) A wooden toy is formed by a cone fixed on a hemisphere of the same radius $\frac{45}{2}$ cm. Its total height is $\frac{105}{2}$ cm. Find the exposed surface area and the cost of painting it at ₹16 per cm^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 7 cm, the total length is $\frac{143}{3}$ cm, and each cone is $\frac{28}{3}$ cm high. Find the volume of air inside and the total outer surface area. Neglect sheet thickness and give exact values.

35. (A) A kite K is attached to a taut 44 m string held at ground point A, making 30° with the ground. An observer S on a roof 11 m high sees K at an elevation of 45° . A and the building lie on opposite sides of the point O vertically below K. Find the height KO and horizontal distance AB in exact form.



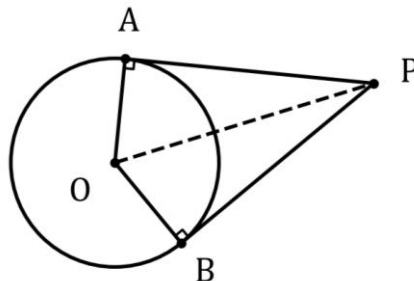
OR

(B) From a window 56 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. Two straight paths PA and PB touch a circular park at A and B. Its centre is O, its radius is 65 m and $OP = 169$ 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.

37. A school buys notebooks and pens for its mathematics club. Three notebooks and two pens cost ₹304, while two notebooks and five pens cost ₹320. Let the price of a notebook be ₹x and that of a pen be ₹y.

- (i) Write the equation for the first purchase.
- (ii) Write the equation for the second purchase.
- (iii) (A) Find the price of each item.

OR

- (iii) (B) Find the cost of four notebooks and three pens.

38. Tiwari Academy records the scores of 57 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	3	6	12	28	8

- (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.