

Mathematics Standard

Sample Question Paper 19

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.

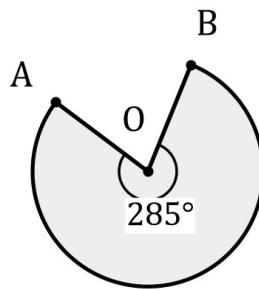
SECTION A

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

1. The mean ages of men and women in a group are 58 and 42 years. The combined mean is 48 years. The percentage of women is:

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

2. In the sector diagram, a circle has radius 147 cm. Find the length of the arc subtending 285° at its centre.



- (A) $\frac{1463}{4}$ cm (B) $\frac{1463}{2}$ cm
(C) 1463 cm (D) $\frac{1477}{2}$ cm

3. A card is drawn at random from cards numbered 1 to 66. The probability of a perfect-square number is:

- (A) $\frac{3}{22}$ (B) $\frac{7}{66}$
(C) $\frac{4}{33}$ (D) $\frac{29}{33}$

4. One card is drawn from a well-shuffled standard pack of 52 cards. What is the probability of drawing a diamond other than its ace and king?

(A) $\frac{3}{13}$

(B) $\frac{5}{26}$

(C) $\frac{11}{52}$

(D) $\frac{41}{52}$

5. A bag contains 21 red, 9 blue and 2 green balls. One ball is drawn at random. The probability that it is not blue is:

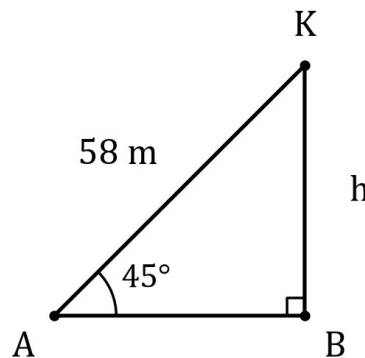
(A) 0

(B) $\frac{23}{32}$

(C) 1

(D) $\frac{21}{32}$

6. A kite is attached to a taut string of length 58 m, held at ground level. Using the angle shown, its height above the ground is:



(A) $29\sqrt{2}$ m

(B) 58 m

(C) 30 m

(D) 28 m

7. The roots of $x^2 - 20x = 0$ are:

(A) 0, -20

(B) 20, -20

(C) 1, 20

(D) 0, 20

8. A cone of radius 19 cm and height 19 cm is joined to a hemisphere of the same radius. The volume of the solid is:

(A) 6859π cm³

(B) 13718π cm³

(C) $\frac{6859}{3}\pi$ cm³

(D) 20577π cm³

9. 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	7	30	9	4

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

10. The 30th term of the AP 31, 36, 41, ... is:

- (A) 181 (B) 171
(C) 176 (D) 186

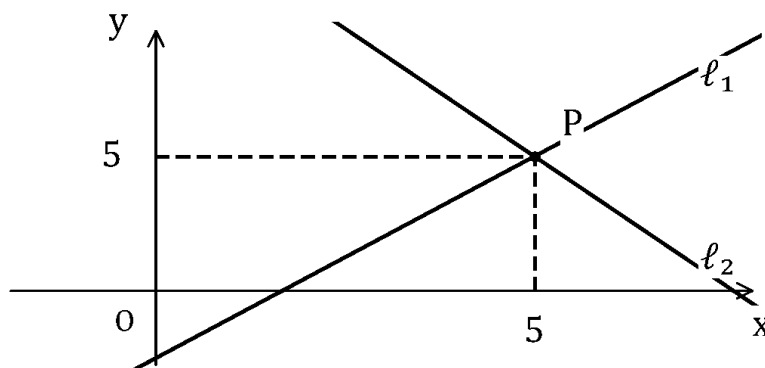
11. In ΔABC , D lies on AB and E on AC; $DE \parallel BC$, $AD : DB = 4 : 3$ and $BC = 147$ cm. DE equals:

- (A) 85 cm (B) 84 cm
(C) 86 cm (D) 147 cm

12. If 20 is a zero of $x^2 + 6x + c$, then c equals:

- (A) 520 (B) -520
(C) -500 (D) -540

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



- (A) (-5, 5) (B) (5, -5)
(C) (5, 5) (D) (-5, -5)

14. An arc has length 20π cm and its sector has area 230π cm². The radius is:

- (A) 23 cm (B) 46 cm
(C) $\frac{23}{2}$ cm (D) 25 cm

15. For an acute angle θ , $\sin \theta = \frac{399}{401}$. Find $\cot \theta$.

(A) $\frac{399}{40}$

(B) $\frac{40}{401}$

(C) $\frac{401}{399}$

(D) $\frac{40}{399}$

16. Two runners take 26 minutes and 28 minutes to complete one lap. Starting together, after how many minutes will both next be at the starting point together?

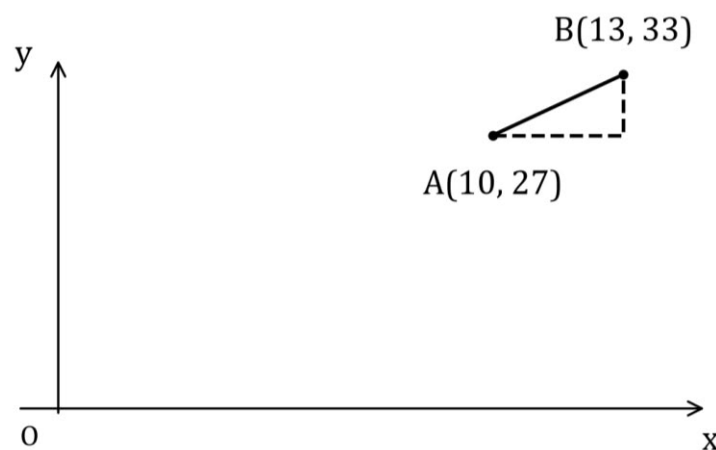
(A) 365

(B) 2

(C) 364

(D) 728

17. Using the coordinate diagram, the distance between A(10, 27) and B(13, 33) is:



(A) $\sqrt{45}$ units

(B) $\sqrt{49}$ units

(C) 9 units

(D) 3 units

18. P divides A(13, -12) and B(28, -6) internally in the ratio 1 : 2. P is:

(A) (19, -10)

(B) (18, -10)

(C) (18, -9)

(D) (17, -11)

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): If A(19, -15) and B(t, -10) lie on the circle with centre O(14, -15), then $t = 14$.

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

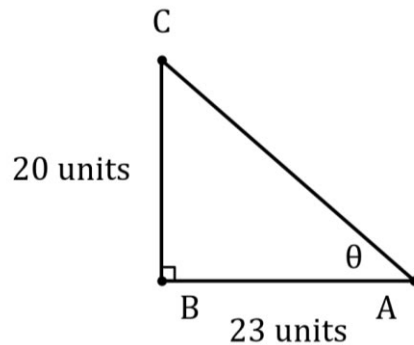
20. Assertion (A): The zeroes of $x^2 - 42x + 440$ are 20 and 22.

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

SECTION B

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

21. In the right triangle shown, $AB = 23$ units, $BC = 20$ units and $\angle A = \theta$. Find $\sin \theta$ and $\cos \theta$.



22. (A) In $\triangle ABC$, D is on AB and E on AC, with $DE \parallel BC$. Given $AD = 22$ cm, $DB = 26$ cm and $AE = 66$ cm, find the full length AC.

OR

(B) In $\triangle PQR$, S lies on PQ and T on PR. Given $PS = 42$ cm, $SQ = 63$ cm, $PT = 84$ cm and $TR = 127$ cm, decide whether $ST \parallel QR$. Justify your answer.

23. (A) Two tanks contain 735 litres and 1155 litres of water. Find the greatest capacity of a container that measures either quantity an exact number of times.

OR

(B) The HCF of 480 and 840 is written as $21m - 21$. Find m.

24. A sector belongs to a circle of diameter 50 cm. Its corresponding arc is 40 cm long. Find the area of the sector.

25. Two fair dice, one red and one blue, are thrown together. Find the probability that (i) exactly one of the numbers is prime, 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 $19 + 4\sqrt{7}$ is irrational.

27. (A) The sum of the first n terms of an AP is $S_n = 19n^2 + 21n$. Find its nth term and its 30th term.

OR

(B) Find the sum of all integers strictly between 28 and 330 that are divisible by 8.

28. Find the zeroes of $x^2 - x - 380$ and verify the relationships between its zeroes and coefficients.

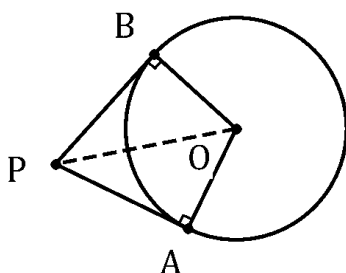
29. (A) For an acute angle θ , $\sec \theta + \tan \theta = 21$. Find $\cos \theta$, $\sin \theta$ and $\tan \theta$.

OR

(B) For an acute angle θ , $\operatorname{cosec} \theta - \cot \theta = \frac{1}{20}$. Find $\operatorname{cosec} \theta$ and $\cot \theta$.

30. Find the coordinates of the points of trisection of the segment joining $A(12, -14)$ and $B(24, -5)$.

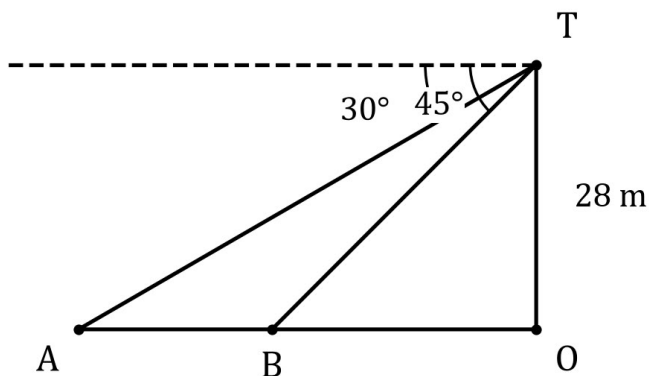
31. PA and PB are tangents from P to the circle with centre O , as shown. $OA = 63$ cm and $OP = 105$ cm. Find PA and the perimeter of quadrilateral $OAPB$. State the geometric facts used.



SECTION D

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

32. (A) From the top T of a 28 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

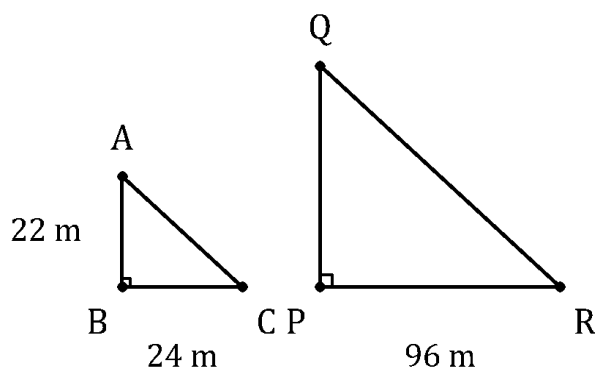
(B) From a window 74 m above level ground, the angles of elevation of the top and depression of the foot of a building across a street are 60° and 45° . Find the street width and the height of that building. Give exact values.

33. (A) A wooden toy is formed by a cone fixed on a hemisphere of the same radius $\frac{63}{2}$ cm. Its total height is $\frac{147}{2}$ cm. Find the exposed surface area and the cost of painting it at ₹22 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 10 cm, the total length is $\frac{203}{3}$ cm, and each cone is $\frac{40}{3}$ cm high. Find the volume of air inside and the total outer surface area. Neglect sheet thickness and give exact values.

34. Using the figure, a vertical pole 22 m tall casts a shadow 24 m long. At the same time, a vertical tower casts a shadow 96 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 120 m long. Find the pole shadow at that later time.



35. A rectangular lawn measures 76 m by 66 m. A rectangular pond is built in its centre, leaving a uniform-width grass strip along all four edges. The grass strip has area 1320 m^2 . Find its width and the pond dimensions.

SECTION E

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

36. Tiwari Academy records the scores of 68 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	5	6	13	34	10

(i) State the modal class.

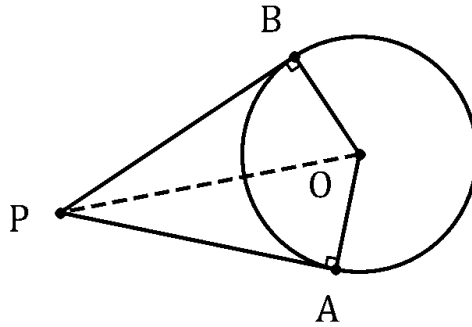
(ii) State the median class.

(iii) (A) Calculate the mean score, correct to two decimal places.

OR

(iii) (B) Calculate the mode, correct to two decimal places.

37. Two straight paths PA and PB touch a circular park at A and B. Its centre is O, its radius is 95 m and $OP = 247$ 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. A school buys notebooks and pens for its mathematics club. Three notebooks and two pens cost ₹418, while two notebooks and five pens cost ₹440. 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.