

Mathematics Standard

Sample Question Paper 5

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. ($20 \times 1 = 20$)

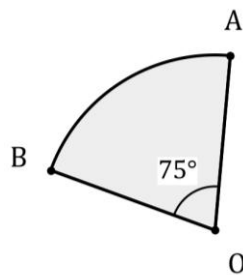
1. The distance between A(-4, -1) and B(0, 3) is:

- (A) $\sqrt{36}$ units (B) 8 units
(C) $\sqrt{32}$ units (D) 0 units

2. The mean ages of men and women in a group are 44 and 28 years. The combined mean is 34 years. The percentage of women is:

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

3. In the sector diagram, a circle has radius 49 cm. Find the length of the arc subtending 75° at its centre.



- (A) $\frac{385}{12}$ cm (B) $\frac{385}{3}$ cm
(C) $\frac{427}{6}$ cm (D) $\frac{385}{6}$ cm

4. An arc has length 6π cm and its sector has area 27π cm². The radius is:

- (A) 18 cm (B) $\frac{9}{2}$ cm
(C) 9 cm (D) 11 cm

5. The HCF of 20 and 30 is:

- (A) 10 (B) 11
(C) 20 (D) 30

6. In $\triangle ABC$, D lies on AB and E on AC; $DE \parallel BC$, $AD : DB = 2 : 4$ and $BC = 42$ cm. DE equals:

- (A) 15 cm (B) 16 cm
(C) 42 cm (D) 14 cm

7. The lines $6x + 2y = 5$ and $18x + ky = 7$ are parallel when k is:

- (A) 3 (B) -6
(C) 6 (D) 7

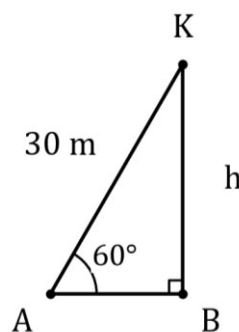
8. If 6 is a zero of $x^2 + 7x + c$, then c equals:

- (A) 78 (B) -72
(C) -84 (D) -78

9. A card is drawn at random from cards numbered 1 to 38. The probability of a perfect-square number is:

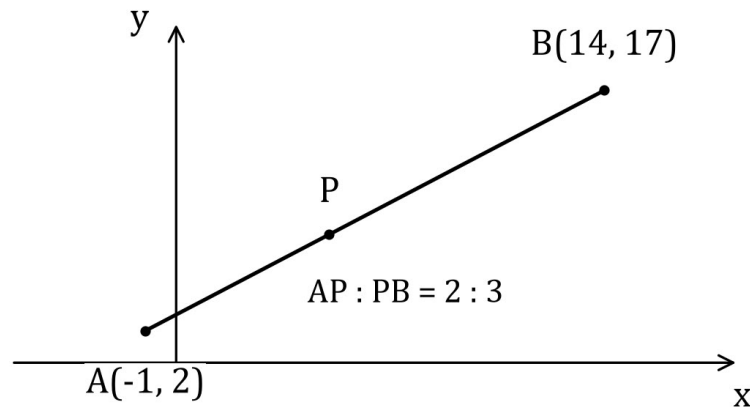
- (A) $\frac{3}{19}$ (B) $\frac{7}{38}$
(C) $\frac{5}{38}$ (D) $\frac{16}{19}$

10. A kite is attached to a taut string of length 30 m, held at ground level. Using the angle shown, its height above the ground is:



- (A) 30 m (B) 16 m
(C) $15\sqrt{3}$ m (D) 14 m

11. Using the coordinate diagram, p divides A(-1, 2) and B(14, 17) internally in the ratio 2 : 3. P is:



- (A) (6, 8) (B) (5, 9)
(C) (4, 7) (D) (5, 8)

12. The 16th term of the AP 3, 9, 15, ... is:

- (A) 93 (B) 99
(C) 87 (D) 105

13. 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	5	16	7	4

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

14. For an acute angle θ , $\sin \theta = \frac{35}{37}$. Find $\cot \theta$.

- (A) $\frac{35}{12}$ (B) $\frac{12}{35}$
(C) $\frac{12}{37}$ (D) $\frac{37}{35}$

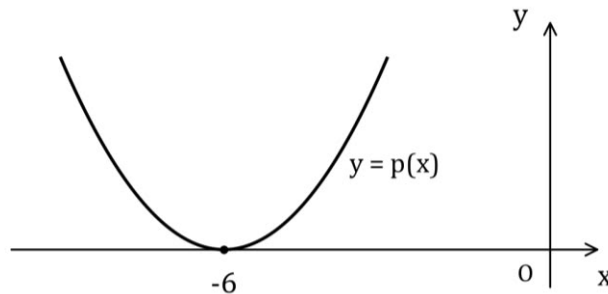
15. A cone of radius 5 cm and height 5 cm is joined to a hemisphere of the same radius. The volume of the solid is:

- (A) $250\pi \text{ cm}^3$ (B) $\frac{125}{3}\pi \text{ cm}^3$
(C) $125\pi \text{ cm}^3$ (D) $375\pi \text{ cm}^3$

16. One card is drawn from a well-shuffled standard pack of 52 cards. What is the probability of drawing a jack of a black suit?

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

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



- (A) -7, -5 (B) -6, -6
(C) -6, -5 (D) -7, -6

18. A bag contains 7 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) $\frac{7}{20}$ (D) $\frac{1}{2}$

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 $A(6, -1)$ and $B(t, 5)$ lie on the circle with centre $O(0, -1)$, then $t = 0$.

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

20. Assertion (A): The zeroes of $x^2 - 14x + 48$ are 6 and 8.

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. ($5 \times 2 = 10$)

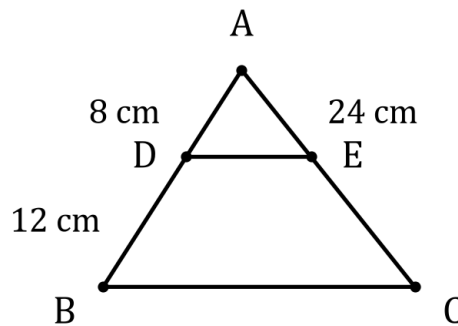
21. Two fair dice, one red and one blue, are thrown together. Find the probability that
(i) exactly one die shows 6, and (ii) this event does not occur.

22. (A) Two tanks contain 245 litres and 385 litres of water. Find the greatest capacity of a container that measures either quantity an exact number of times.

OR

(B) The HCF of 144 and 252 is written as $7m - 7$. Find m .

23. (A) In the figure, D lies on AB and E on AC, with $DE \parallel BC$. $AD = 8$ cm, $DB = 12$ cm and $AE = 24$ cm. Find the full length AC.



OR

(B) In ΔPQR , S lies on PQ and T on PR. Given $PS = 14$ cm, $SQ = 21$ cm, $PT = 28$ cm and $TR = 43$ cm, decide whether $ST \parallel QR$. Justify your answer.

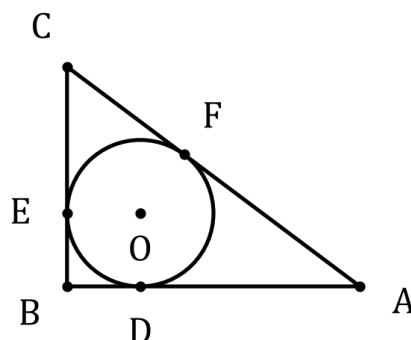
24. For an acute angle θ , $\tan \theta = \frac{2}{3}$. Find $\sin \theta$ and $\cos \theta$.

25. A sector belongs to a circle of diameter 22 cm. Its corresponding arc is 12 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. $AB = 28$ cm, $BC = 21$ cm and $AC = 35$ cm. Find AD, BE and CF.



27. (A) The sum of the fifth and ninth terms of an AP is 36; the sum of its seventh and twelfth terms is 46. Find the AP.

OR

(B) Find the sum of all integers strictly between 14 and 190 that are divisible by 8.

28. Find the coordinates of the points of trisection of the segment joining A(-2, 0) and B(4, 12).

29. Given that $\sqrt{11}$ is irrational, prove that $5 + 2\sqrt{11}$ is irrational.

30. (A) For an acute angle θ , $9\sin^2\theta + 6\cos^2\theta = \frac{27}{4}$. Find $\sin^2\theta$, $\tan \theta$ and $\sec \theta$.

OR

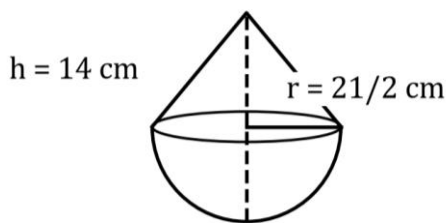
(B) For an acute angle θ , $\operatorname{cosec} \theta - \cot \theta = \frac{1}{6}$. Find $\operatorname{cosec} \theta$ and $\cot \theta$.

31. Find the zeroes of $2x^2 - 2x - 60$ and verify the relationships between its zeroes and coefficients.

SECTION D

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

32. (A) A wooden toy is formed by a cone fixed on a hemisphere of the same radius $\frac{21}{2}$ cm. Its total height is $\frac{49}{2}$ cm. Find the exposed surface area and the cost of painting it at ₹8 per cm^2 . Give exact values.



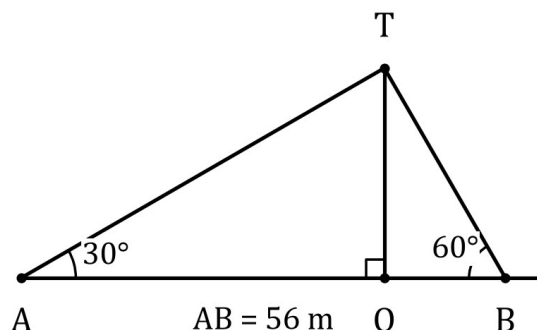
OR

(B) A closed thin-sheet model consists of a cylinder with a cone attached at each end. The common radius is 3 cm, the total length is 21 cm, and each cone is 4 cm high. Find the volume of air inside and the total outer surface area. Neglect sheet thickness and give exact values.

33. The sum of the areas of two squares is 337 cm^2 . Their perimeters differ by 28 cm. Find their side lengths and areas.

34. In $\triangle ABC$, points D and E lie on AB and AC respectively. $AD = 8$ cm, $DB = 10$ cm, $AE = 16$ cm, $EC = 20$ cm and $BC = 36$ 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. $AB = 56$ 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 32 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. A school buys notebooks and pens for its mathematics club. Three notebooks and two pens cost ₹152, while two notebooks and five pens cost ₹160. Let the price of a notebook be ₹x and that of a pen be ₹y.

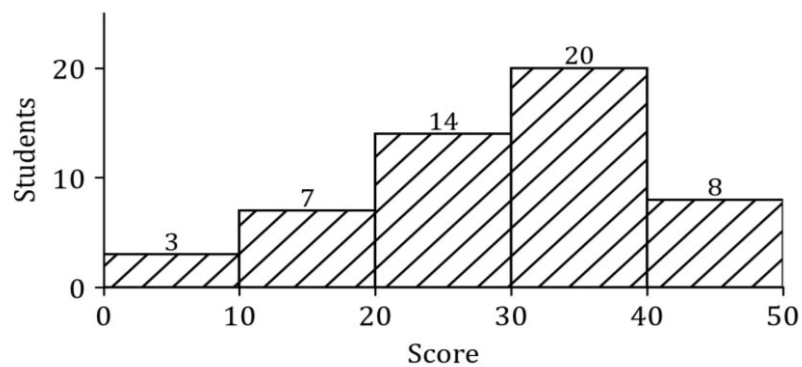
- Write the equation for the first purchase.
- Write the equation for the second purchase.
- (A) Find the price of each item.

OR

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

37. Tiwari Academy records the scores of 52 students (See Graph) in a mathematics quiz. The histogram gives the grouped frequency distribution. The classes are continuous, with the upper endpoint excluded from each class.

- State the modal class.
- State the median class.
- (A) Calculate the mean score, correct to two decimal places.



OR

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

38. A designer draws two tangents PA and PB to a circle with centre O. The radius is 7 cm and $OP = 14$ 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.