

Mathematics Standard

Sample Question Paper 1

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 HCF of 96 and 404 is:

- (A) 2 (B) 4
(C) 8 (D) 12

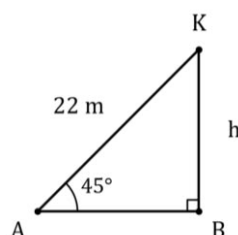
2. The following distribution gives the lifetimes of 225 electrical components. The modal class is:

Lifetime (h)	0-20	20-40	40-60	60-80	80-100	100-120
Frequency	10	35	52	61	38	29

- (A) 40-60 hours (B) 60-80 hours
(C) 80-100 hours (D) 100-120 hours

3. A kite is attached to a taut string of length 22 m, held at ground level. Using the angle shown, its height above the ground is:

- (A) 22 m
(B) 12 m
(C) $11\sqrt{2}$ m
(D) 10 m



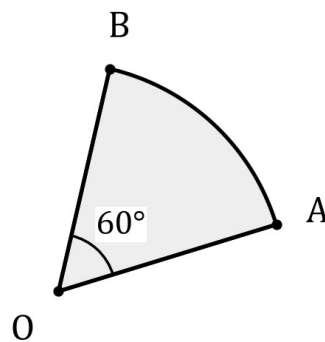
4. The value(s) of k for which $2x^2 + kx + 2 = 0$ has equal roots is/are:

- (A) 4 only (B) -4 only
(C) ± 4 (D) 0

5. A bag contains only lemon-flavoured candies. One candy is taken out at random. The probability that it is orange-flavoured is:

- (A) 0 (B) $\frac{1}{2}$
(C) 1 (D) Cannot be determined

6. In the sector diagram, in a circle of radius 21 cm, an arc subtends 60° at the centre. The length of the arc is:



- (A) 11 cm (B) 22 cm
(C) 44 cm (D) 66 cm

7. The 30th term of the AP 10, 7, 4, ... is:

- (A) 97 (B) 77
(C) -77 (D) -87

8. One card is drawn from a well-shuffled deck of 52 cards. The probability of getting a red king is:

- (A) $\frac{1}{52}$ (B) $\frac{1}{26}$
(C) $\frac{1}{13}$ (D) $\frac{1}{2}$

9. A solid consists of a cone standing on a hemisphere. Both have radius 1 cm and the cone has height 1 cm. Its volume is:

- (A) $\frac{\pi}{3} \text{ cm}^3$
(B) $\frac{2\pi}{3} \text{ cm}^3$
(C) $\pi \text{ cm}^3$
(D) $2\pi \text{ cm}^3$

10. $\triangle AHK \sim \triangle ABC$. If $AK = 10$ cm, $BC = 3.5$ cm and $HK = 7$ cm, then AC is:

- (A) 2.5 cm (B) 5 cm
(C) 10 cm (D) 20 cm

11. The length of an arc is 6π cm and the area of its sector is 24π cm². The radius of the circle is:

- (A) 4 cm (B) 8 cm
(C) 12 cm (D) 16 cm

12. The distance between the points $(2, 3)$ and $(4, 1)$ is:

- (A) 2 units (B) $2\sqrt{2}$ units
(C) 4 units (D) $4\sqrt{2}$ units

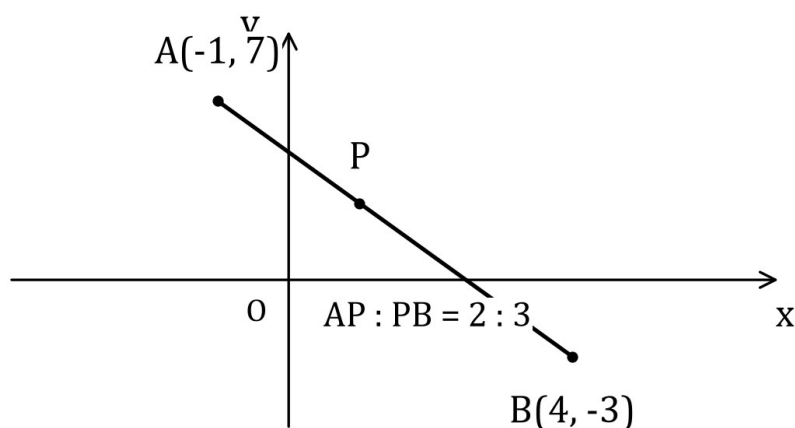
13. If $\sin A = \frac{3}{4}$ and A is acute, then $\cos A$ equals:

- (A) $\frac{1}{4}$ (B) $\frac{3}{\sqrt{7}}$
(C) $\frac{\sqrt{7}}{4}$ (D) $\frac{4}{\sqrt{7}}$

14. The mean age of all employees in an office is 35 years. The mean ages of the men and women are 38 years and 30 years respectively. The percentage of women in the office is:

- (A) 25% (B) 30%
(C) 35% (D) 37.5%

15. Using the coordinate diagram, the point dividing the line segment joining $(-1, 7)$ and $(4, -3)$ internally in the ratio $2 : 3$ is:



- (A) $(1, 3)$ (B) $(2, 1)$
(C) $(3, 1)$ (D) $(1, -3)$

16. A box contains 5 red, 8 white and 4 green marbles. One marble is drawn at random. The probability that it is not green is:

(A) $\frac{4}{17}$

(B) $\frac{5}{17}$

(C) $\frac{8}{17}$

(D) $\frac{13}{17}$

17. What number should be added to $x^2 - 5x + 4$ so that 3 is a zero of the resulting polynomial?

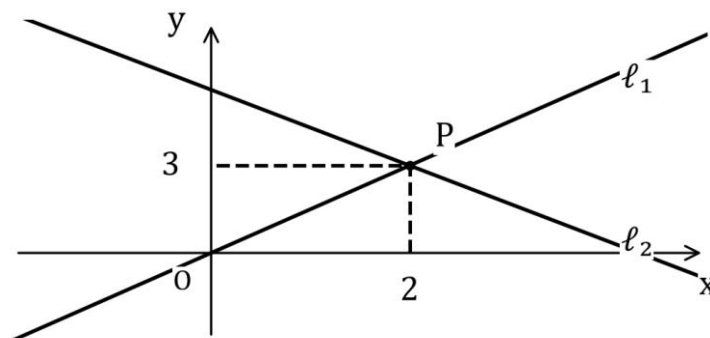
(A) 1

(B) 2

(C) 4

(D) 5

18. 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, 3)

(B) (-2, 3)

(C) (2, -3)

(D) (-2, -3)

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: 1 and -4 are the zeroes of $x^2 - 3x - 4$.

Reason R: A real number k is a zero of a polynomial $p(x)$ if $p(k) = 0$.

20. Assertion A: If A(4, 3) and B(x, 5) lie on a circle with centre O(2, 3), then $x = 2$.

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

SECTION B

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

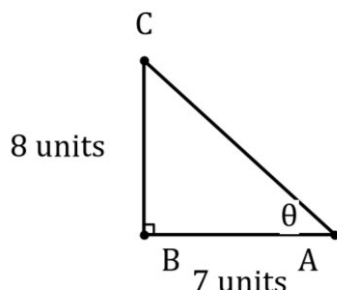
21. A fair die is thrown twice. Find the probability that (i) 5 does not appear on either throw and (ii) 5 appears at least once.

22. (A) The diagonals AC and BD of trapezium ABCD, with $AB \parallel DC$, intersect at O. Using similarity, prove that $\frac{OA}{OC} = \frac{OB}{OD}$.

OR

(B) E lies on AD produced beyond D in parallelogram ABCD. BE intersects CD at F. Prove that $\triangle ABE \sim \triangle CFB$.

23. In the right triangle shown, $AB = 7$ units, $BC = 8$ units and $\angle A = \theta$. Evaluate $\frac{(1+\sin \theta)(1-\sin \theta)}{(1+\cos \theta)(1-\cos \theta)}$.



24. Find the area of a sector of a circle of diameter 28 cm if its corresponding arc has length 22 cm.

25. (A) Two tankers contain 850 litres and 680 litres of petrol. Find the maximum capacity of a container that can measure the petrol in either tanker an exact number of times.

OR

(B) If the HCF of 144 and 180 is expressed as $13m - 3$, find m .

SECTION C

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

26. Prove that $\sqrt{5}$ is irrational.

27. (A) Prove the following identity, for values of x for which the expressions are defined:

$$\frac{1}{\sec x - \tan x} - \frac{1}{\cos x} = \frac{1}{\cos x} - \frac{1}{\sec x + \tan x}$$

OR

(B) Prove the following identity, for values of x for which the expressions are defined:

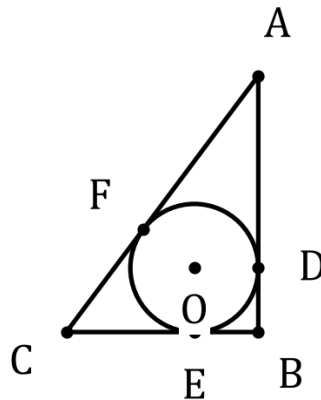
$$2\sec^2 x - \sec^4 x - 2\operatorname{cosec}^2 x + \operatorname{cosec}^4 x = \cot^4 x - \tan^4 x$$

28. (A) The sum of the 5th and 9th terms of an AP is 72 and the sum of its 7th and 12th terms is 97. Find the AP.

OR

(B) Find the sum of the integers between 10 and 500 that are divisible by 7.

29. The circle in the figure is inscribed in right triangle ABC and touches AB, BC and CA at D, E and F respectively. AB = 12 cm, BC = 9 cm and AC = 15 cm. Find AD, BE and CF.



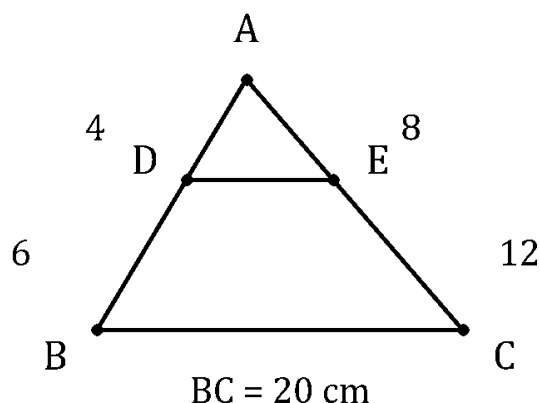
30. Find the zeroes of $6x^2 - 7x - 3$ and verify the relationships between its zeroes and coefficients.

31. Find the coordinates of the points of trisection of the line segment joining A(2, -2) and B(-7, 4).

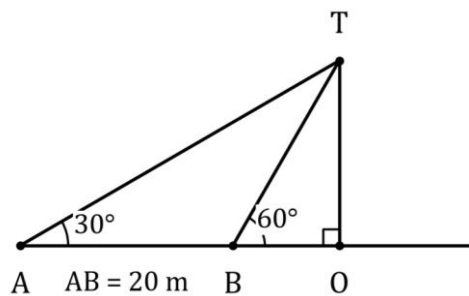
SECTION D

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

32. Using the figure, in $\triangle ABC$, D lies on AB and E on AC. AD = 4 cm, DB = 6 cm, AE = 8 cm, EC = 12 cm and BC = 20 cm. Prove that $DE \parallel BC$ and $\triangle ADE \sim \triangle ABC$. Find DE and the perimeter of $\triangle ADE$.



33. (A) Points A, B and O lie in this order on level ground. OT is a vertical tower. $AB = 20$ 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 60 m above level ground, the angles of elevation and depression of the top and foot of a house across the street are 60° and 45° respectively. Find the width of the street and show that the height of the opposite house is $60(1 + \sqrt{3})$ m.

34. (A) A toy is formed by a cone mounted on a hemisphere of the same radius, 3.5 cm. The total height of the toy is 15.5 cm. Find its total exposed surface area. Also find the cost of painting it at ₹10 per cm^2 .

OR

(B) A closed model consists of a cylinder with a cone attached at each end. The common diameter is 3 cm and its total length is 12 cm. Each cone has height 2 cm. Find (i) the volume of air inside the model and (ii) its total outer surface area. Neglect the thickness of the material.

35. Two water taps together can fill a tank in 6 hours. The tap of larger diameter takes 9 hours less than the smaller tap to fill the tank separately. Find the time taken by each tap to fill the tank on its own.

SECTION E

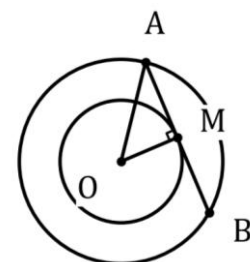
Questions 36 to 38 carry 4 marks each. ($3 \times 4 = 12$)

36. A circular garden of radius 5 m has a concentric circular flower bed of radius 3 m. A straight path AB is a chord of the outer boundary and touches the flower bed at M. O is the common centre.

(i) What is $\angle OMA$? Give a reason.

(ii) Find AM.

(iii) (A) Find the length AB and the area of $\triangle OAB$.



OR

(iii) (B) A second chord of the outer circle is 4 m from O. Find its length.

37. Tiwari Academy conducted a weekly Mathematics test, out of 50 marks, for Class X students. Their marks were grouped as follows:

Marks	0-10	10-20	20-30	30-40	40-50
Students	3	6	12	15	14

- (i) Identify the class with the most common performance range.
- (ii) Find the class interval containing the median.
- (iii) (A) Find the mean marks of the students.

OR

- (iii) (B) Find the mode of the distribution.

38. A school cricket coach buys 7 bats and 6 balls for ₹3,800. Later, the coach buys 3 bats and 5 balls for ₹1,750. The unit prices are unchanged. Let x and y be the prices, in rupees, of one bat and one ball respectively.

- (i) Form the equation for the first purchase.
- (ii) Form the equation for the second purchase.
- (iii) (A) Find the price of one bat and one ball.

OR

- (iii) (B) Find the total cost of 2 bats and 3 balls. Show how you obtain the unit prices.