

Mathematics Standard
Sample Question Paper 17
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.

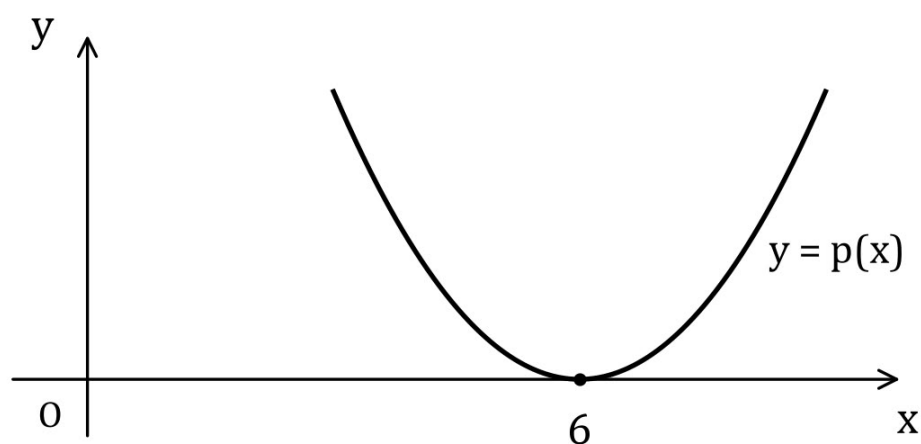
SECTION A

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

1. A cone of radius 17 cm and height 17 cm is joined to a hemisphere of the same radius. The volume of the solid is:

- (A) $9826\pi \text{ cm}^3$ (B) $\frac{4913}{3}\pi \text{ cm}^3$
(C) $4913\pi \text{ cm}^3$ (D) $14739\pi \text{ cm}^3$

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



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

3. For an acute angle θ , $\sin \theta = \frac{323}{325}$. Find $\cot \theta$.

(A) $\frac{323}{36}$

(B) $\frac{36}{323}$

(C) $\frac{36}{325}$

(D) $\frac{325}{323}$

4. The mean ages of men and women in a group are 56 and 40 years. The combined mean is 46 years. The percentage of women is:

(A) 25%

(B) 62.5%

(C) 50%

(D) 75%

5. If 18 is a zero of $x^2 + 4x + c$, then c equals:

(A) 396

(B) -378

(C) -414

(D) -396

6. 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	28	7	4

(A) 0-10 minutes

(B) 20-30 minutes

(C) 10-20 minutes

(D) 30-40 minutes

7. In $\triangle ABC$, D lies on AB and E on AC ; $DE \parallel BC$, $AD : DB = 2 : 4$ and $BC = 114$ cm. DE equals:

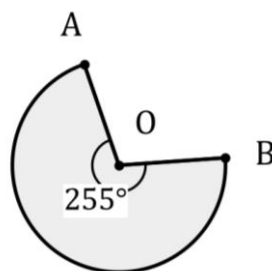
(A) 39 cm

(B) 40 cm

(C) 114 cm

(D) 38 cm

8. In the sector diagram, a circle has radius 133 cm. Find the length of the arc subtending 255° at its centre.



(A) $\frac{3553}{12}$ cm

(B) $\frac{3553}{3}$ cm

(C) $\frac{3595}{6}$ cm

(D) $\frac{3553}{6}$ cm

9. The HCF of 44 and 66 is:

- (A) 22 (B) 23
(C) 44 (D) 66

10. A card is drawn at random from cards numbered 1 to 62. The probability of a perfect-square number is:

- (A) $\frac{7}{62}$ (B) $\frac{4}{31}$
(C) $\frac{3}{31}$ (D) $\frac{55}{62}$

11. The 28th term of the AP 27, 30, 33, ... is:

- (A) 108 (B) 111
(C) 105 (D) 114

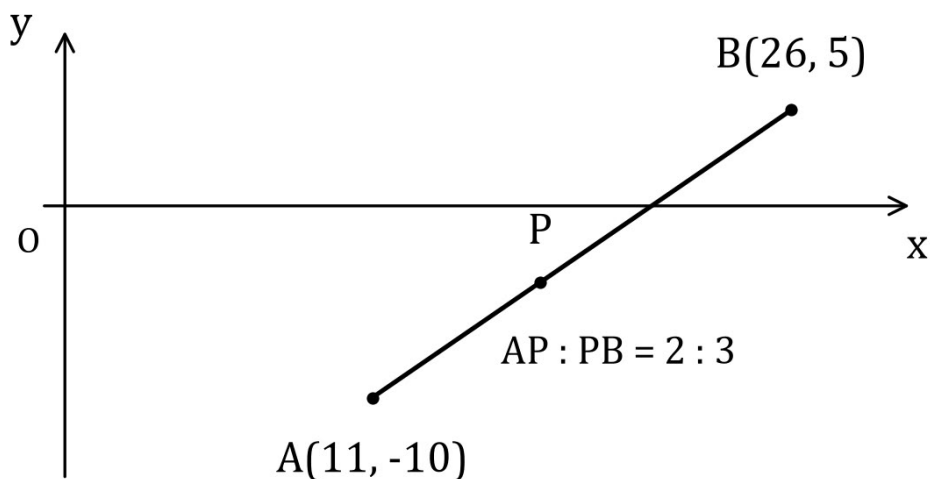
12. An arc has length 18π cm and its sector has area 189π cm². The radius is:

- (A) 42 cm (B) $\frac{21}{2}$ cm
(C) 21 cm (D) 23 cm

13. One card is drawn from a well-shuffled standard pack of 52 cards. What is the probability of drawing a face card of hearts or spades?

- (A) $\frac{3}{26}$ (B) $\frac{7}{52}$
(C) $\frac{5}{52}$ (D) $\frac{23}{26}$

14. Using the coordinate diagram, p divides A(11, -10) and B(26, 5) internally in the ratio 2 : 3. P is:



- (A) (18, -4) (B) (17, -3)
(C) (16, -5) (D) (17, -4)

15. A bag contains 19 red, 7 blue and 3 green balls. One ball is drawn at random. The probability that it is not blue is:

- (A) 0 (B) 1
(C) $\frac{19}{29}$ (D) $\frac{22}{29}$

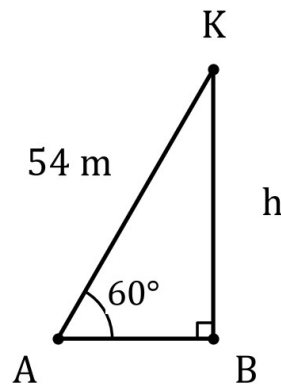
16. The lines $18x + 2y = 5$ and $54x + ky = 7$ are parallel when k is:

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

17. The distance between A(8, 23) and B(12, 27) is:

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

18. A kite is attached to a taut string of length 54 m, held at ground level. Using the angle shown, its height above the ground is:



- (A) 54 m (B) 28 m
(C) $27\sqrt{3}$ m (D) 26 m

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(15, -13) and B(t, -10) lie on the circle with centre O(12, -13), then $t = 12$.

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

20. Assertion (A): The zeroes of $x^2 - 38x + 360$ are 18 and 20.

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) the two numbers differ by 3, and (ii) this event does not occur.

22. A sector belongs to a circle of diameter 46 cm. Its corresponding arc is 36 cm long. Find the area of the sector.

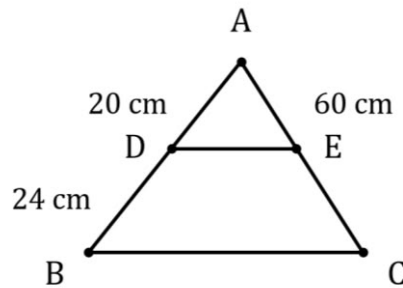
23. For an acute angle θ , $\tan \theta = \frac{6}{7}$. Find $\sin \theta$ and $\cos \theta$.

24. (A) Two tanks contain 665 litres and 1045 litres of water. Find the greatest capacity of a container that measures either quantity an exact number of times.

OR

(B) The HCF of 432 and 756 is written as $19m - 19$. Find m .

25. (A) In the figure, D lies on AB and E on AC, with $DE \parallel BC$. $AD = 20$ cm, $DB = 24$ cm and $AE = 60$ cm. Find the full length AC.



OR

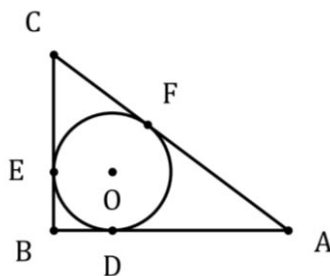
(B) In ΔPQR , S lies on PQ and T on PR. Given $PS = 38$ cm, $SQ = 57$ cm, $PT = 76$ cm and $TR = 115$ cm, decide whether $ST \parallel QR$. Justify your answer.

SECTION C

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

26. Given that $\sqrt{3}$ is irrational, prove that $17 + 2\sqrt{3}$ is irrational.

27. The circle in the figure is inscribed in right triangle ABC and touches AB, BC and CA at D, E and F respectively. $AB = 76$ cm, $BC = 57$ cm and $AC = 95$ cm. Find AD, BE and CF.



28. (A) For an acute angle θ , $21\sin^2\theta + 18\cos^2\theta = \frac{75}{4}$. Find $\sin^2\theta$, $\tan \theta$ and $\sec \theta$.

OR

(B) For an acute angle θ , $\operatorname{cosec} \theta - \cot \theta = \frac{1}{18}$. Find $\operatorname{cosec} \theta$ and $\cot \theta$.

29. Find the zeroes of $2x^2 - 2x - 612$ and verify the relationships between its zeroes and coefficients.

30. (A) The sum of the fifth and ninth terms of an AP is 60; the sum of its seventh and twelfth terms is 70. Find the AP.

OR

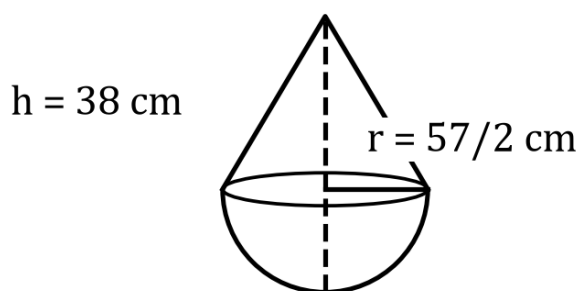
(B) Find the sum of all integers strictly between 26 and 310 that are divisible by 6.

31. Find the coordinates of the points of trisection of the segment joining A(10, -12) and B(16, 0).

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 $\frac{57}{2}$ cm. Its total height is $\frac{133}{2}$ cm. Find the exposed surface area and the cost of painting it at ₹20 per cm^2 . Give exact values.



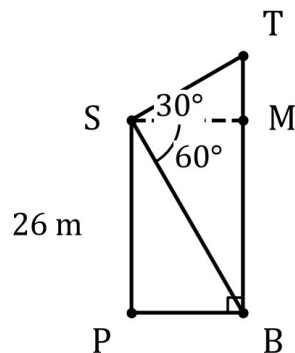
OR

(B) A closed thin-sheet model consists of a cylinder with a cone attached at each end. The common radius is 9 cm, the total length is 61 cm, and each cone is 12 cm high. Find the volume of air inside and the total outer surface area. Neglect sheet thickness and give exact values.

33. In $\triangle ABC$, points D and E lie on AB and AC respectively. $AD = 20 \text{ cm}$, $DB = 22 \text{ cm}$, $AE = 40 \text{ cm}$, $EC = 44 \text{ cm}$ and $BC = 84 \text{ cm}$. Prove that $DE \parallel BC$ and $\triangle ADE \sim \triangle ABC$. Find DE and the perimeter of $\triangle ADE$.

34. A fast train takes 2 hours less than a slow train to travel 2200 km. The slow train travels 10 km/h slower than the fast train. Find both speeds.

35. (A) S is a point on a roof 26 m above level ground. The top T and foot B of a vertical tower are seen from S at angles of elevation 30° and depression 60° respectively. With SM horizontal, find the horizontal distance PB and tower height BT in exact form.



OR

(B) From a window 68 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. ($3 \times 4 = 12$); subparts (i), (ii), (iii): 1, 1, 2 marks.

36. A designer draws two tangents PA and PB to a circle with centre O. The radius is 19 cm and $OP = 38$ 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.

37. A school buys notebooks and pens for its mathematics club. Three notebooks and two pens cost ₹380, while two notebooks and five pens cost ₹400. Let the price of a notebook be ₹x and that of a pen be ₹y.

(i) Write the equation for the first purchase.

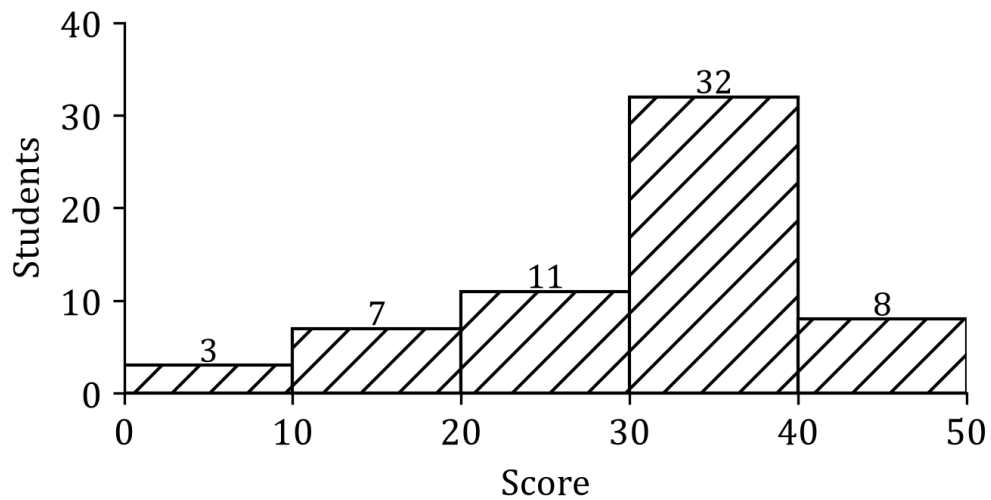
(ii) Write the equation for the second purchase.

(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 61 students in a mathematics quiz. The histogram gives the grouped frequency distribution. The classes are continuous, with the upper endpoint excluded from each class.



- (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.