SAMPLE PAPER 2

MATHEMATICS STANDARD (041)

CLASS X (2026 – 27)

Question Paper

Maximum Marks: 80 **Time Allowed: 3 hours**

General Instructions: Read the following instructions very carefully and strictly follow them:

1. This question paper contains 38 questions. All questions are compulsory.
2. This question paper is divided into five sections – A, B, C, D and E.
3. In Section A, questions 1 to 18 are multiple choice questions (MCQs) and questions 19 and 20 are Assertion–Reason based questions of 1 mark each.
4. In Section B, questions 21 to 25 are very short answer (VSA) type questions, carrying 2 marks each.
5. In Section C, questions 26 to 31 are short answer (SA) type questions, carrying 3 marks each.
6. In Section D, questions 32 to 35 are long answer (LA) type questions, carrying 5 marks each.
7. In Section E, questions 36 to 38 are case study based questions, carrying 4 marks each.
8. There is no overall choice. However, an internal choice has been provided in 2 questions in Section B, 2 questions in Section C and 2 questions in Section D. An internal choice has been provided in the 2-mark sub-part of each question in Section E.
9. Draw neat and clean figures wherever required. Take π = 22/7 wherever required, if not stated.
10. Use of calculators is not allowed.

SECTION – A **(20 × 1 = 20)**

This section comprises 18 multiple choice questions and 2 Assertion–Reason based questions of 1 mark each.

1. The LCM of $2^3 \times 3^2$ and $2^2 \times 3^3$ is: **[1]**

(A) 108 (B) 216

(C) 36 (D) 72

2. A quadratic polynomial, the sum and product of whose zeroes are 5 and 6 respectively, is: **[1]**

(A) $x^2 + 5x + 6$ (B) $x^2 - 6x + 5$

(C) $x^2 - 5x + 6$ (D) $x^2 + 5x - 6$

3. The lines represented by the equations $2x + 3y = 5$ and $4x + 6y = 7$ are: **[1]**

(A) parallel (B) intersecting at one point

(C) coincident (D) perpendicular

4. The positive value of k for which the quadratic equation $x^2 - kx + 9 = 0$ has two equal roots is: **[1]**

(A) 3 (B) 9

(C) -6 (D) 6

5. The sum of the first 15 multiples of 4 is: **[1]**

(A) 420 (B) 480

(C) 540 (D) 240

6. $\triangle ABC \sim \triangle DEF$ with AB = 4 cm and DE = 6 cm. If the perimeter of $\triangle ABC$ is 24 cm, then the perimeter of $\triangle DEF$ is: **[1]**

(A) 16 cm (B) 30 cm

(C) 36 cm (D) 48 cm

7. The mid-point of the line segment joining the points (1, 8) and (7, −2) is: **[1]**

(A) (4, 3) (B) (3, 4)

(C) (6, 10) (D) (4, 5)

8. The value of $2\sin^2 30° + 3\cos^2 60°$ is: **[1]**

(A) 1 (B) $\frac{5}{2}$

(C) $\frac{3}{4}$ (D) $\frac{5}{4}$

9. Two tangents drawn from an external point to a circle of radius 4 cm are perpendicular to each other. The length of each tangent is: **[1]**

(A) $4\sqrt{2}$ cm (B) 4 cm

(C) 8 cm (D) $2\sqrt{2}$ cm

10. The area swept by the minute hand of a clock, 14 cm long, in 15 minutes is: **[1]**

(A) 154 cm^2 (B) 616 cm^2

(C) 77 cm^2 (D) 308 cm^2

11. The total surface area of a solid hemisphere of radius 14 cm is: **[1]**

(A) 1232 cm^2 (B) 616 cm^2

(C) 1848 cm^2 (D) 2464 cm^2

12. In the step-deviation method, the assumed mean is 25, the class size is 10 and the mean of the deviations u_i is −0.3. The mean of the data is: **[1]**

(A) 25.3 (B) 24.7

(C) 28 (D) 22

13. The probability that a leap year selected at random has 53 Sundays is: **[1]**

(A) $\frac{2}{7}$ (B) $\frac{1}{7}$

(C) $\frac{53}{366}$ (D) $\frac{1}{53}$

14. The point which divides the line segment joining $(2, -5)$ and $(-3, 5)$ internally in the ratio $3 : 2$ is: **[1]**

(A) $(1, -1)$ (B) $(-1, 1)$

(C) $(0, 0)$ (D) $(-1, -1)$

15. If $\sec\theta = \frac{13}{12}$, then $\cot\theta$ is: **[1]**

(A) $\frac{5}{12}$ (B) $\frac{13}{5}$

(C) $\frac{12}{5}$ (D) $\frac{5}{13}$

16. When the angle of elevation of the sun is 60°, a vertical tower casts a shadow 30 m long. The height of the tower is: **[1]**

(A) $10\sqrt{3}$ m (B) 30 m

(C) $15\sqrt{3}$ m (D) $30\sqrt{3}$ m

17. The circumference of a circular park is 88 m. Its area is: **[1]**

(A) 308 m^2 (B) 616 m^2

(C) 154 m^2 (D) 1232 m^2

18. A card is drawn at random from a well-shuffled deck of 52 playing cards. The probability that it is a black face card is: **[1]**

(A) $\frac{3}{26}$ (B) $\frac{3}{13}$

(C) $\frac{1}{13}$ (D) $\frac{6}{13}$

Assertion–Reason based questions. Questions 19 and 20 consist of two statements — Assertion (A) and Reason (R). Select the correct answer from the options given below:
(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 point $(0, 4)$ lies on the y-axis. **[1]**
Reason (R): The x-coordinate (abscissa) of every point on the y-axis is zero.

20. **Assertion (A):** The 23rd term of the A.P. 3, 8, 13, … is 113. **[1]**
Reason (R): The nth term of an A.P. with first term a and common difference d is $a + nd$.

SECTION – B **(5 × 2 = 10)**

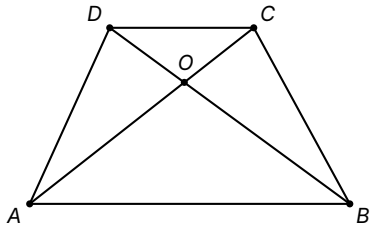
This section comprises 5 very short answer (VSA) type questions of 2 marks each.

21(A). Find the HCF and LCM of 120 and 252 using prime factorisation, and verify that HCF × LCM = product of the two numbers. **[2]**

OR

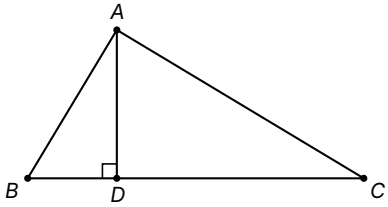
21(B). Given that $\sqrt{5}$ is irrational, prove that $3 + 2\sqrt{5}$ is irrational. **[2]**

22(A). ABCD is a trapezium with AB ∥ DC, and its diagonals AC and BD intersect at O. If OA = $(3x - 1)$ cm, OC = $(5x - 3)$ cm, OB = $(2x + 1)$ cm and OD = $(6x - 5)$ cm, find the value of x. **[2]**



OR

22(B). In the given figure, ∠BAC = 90° and AD ⊥ BC. Prove that AD^2 = BD × DC. **[2]**



23. If $\sin\theta + \cos\theta = \sqrt{2}$, find the value of $\tan\theta + \cot\theta$. **[2]**

24. The perimeter of a sector of a circle of radius 5.6 cm is 27.2 cm. Find the area of the sector. **[2]**

25. In a lot of 600 bulbs, the probability of picking a defective bulb at random is 0.04. Find the number of good bulbs in the lot. If 8 good bulbs are removed from the lot, find the probability that a bulb picked at random from the rest is defective. **[2]**

SECTION – C **(6 × 3 = 18)**

This section comprises 6 short answer (SA) type questions of 3 marks each.

26. Prove that $\sqrt{3}$ is irrational. **[3]**

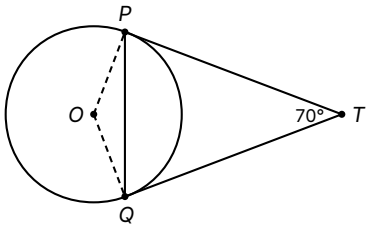
27. Find a quadratic polynomial whose zeroes are the reciprocals of the zeroes of the polynomial $2x^2 - 7x + 3$. **[3]**

28(A). The cost of 4 chairs and 3 tables is ₹ 5400, and the cost of 3 chairs and 2 tables is ₹ 3750. Find the cost of one chair and one table. **[3]**

OR

28(B). In △ABC, ∠C = 3∠B = 2(∠A + ∠B). Find the three angles of the triangle. **[3]**

29. PQ is a chord of a circle with centre O. The tangents at P and Q meet at T. Prove that ∠TPQ = ∠TQP. If ∠PTQ = 70°, find ∠TPQ and ∠POQ. **[3]**



30. Using the distance formula, show that the points A(1, −1), B(4, 3) and C(7, 7) are collinear. Also find the ratio in which B divides AC. **[3]**

31(A). Prove that $\tan^2\theta - \sin^2\theta = \tan^2\theta \sin^2\theta$, where θ is an acute angle. **[3]**

OR

31(B). If $\sin\theta + \sin^2\theta = 1$, prove that $\cos^2\theta + \cos^4\theta = 1$. **[3]**

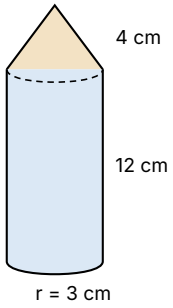
SECTION – D **(4 × 5 = 20)**

This section comprises 4 long answer (LA) type questions of 5 marks each.

32. A shopkeeper buys a number of books for ₹ 1200. If he had bought 10 more books for the same amount, each book would have cost ₹ 20 less. Find the number of books he bought and the cost of each book. **[5]**

33. Prove that if a line divides any two sides of a triangle in the same ratio, then the line is parallel to the third side.
Using the above result, solve the following: In △PQR, S and T are points on PQ and PR such that PS = 1.5 cm, SQ = 3 cm, PT = 2 cm and TR = 4 cm. Show that ST ∥ QR, and find ST if QR = 9 cm. **[5]**

34(A). A toy rocket is made of a cylinder of radius 3 cm and height 12 cm, with a cone of the same radius and height 4 cm fixed on top, as shown. Find the volume and the total surface area of the rocket. (Use π = 3.14) **[5]**



OR

34(B). A solid consists of a cylinder of radius 6 cm and height 15 cm, with a cone of height 8 cm on one end and a hemisphere on the other end, both of the same radius. Find the volume and the total surface area of the solid. (Use π = 3.14) **[5]**

35(A). From the top of a 50 m high tower, the angles of depression of two cars on a straight road on the same side of the tower are 60° and 30°. Find the distance between the two cars. (Use $\sqrt{3}$ = 1.73) **[5]**

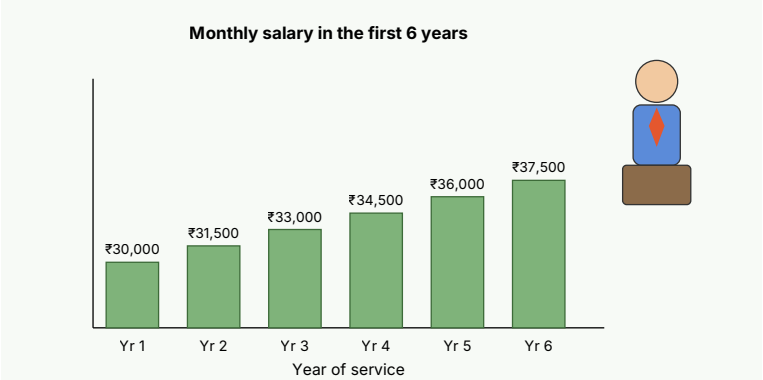
OR

35(B). An aeroplane flying horizontally at a height of 1200 m is observed from a point on the ground. The angle of elevation changes from 60° to 30° in 10 seconds. Find the speed of the aeroplane in m/s and in km/h. (Use $\sqrt{3}$ = 1.732) **[5]**

SECTION – E **(3 × 4 = 12)**

This section comprises 3 case study based questions of 4 marks each. Each has three sub-parts (i), (ii), (iii) of 1, 1 and 2 marks respectively.

36. Neha joins a company at a monthly salary of ₹ 30,000. Her monthly salary increases by ₹ 1,500 at the start of every new year, as shown below. **[4]**



Based on the above information, answer the following questions:

(i) What is her monthly salary in the 8th year? **[1]**

(ii) In which year will her monthly salary be ₹ 48,000? **[1]**

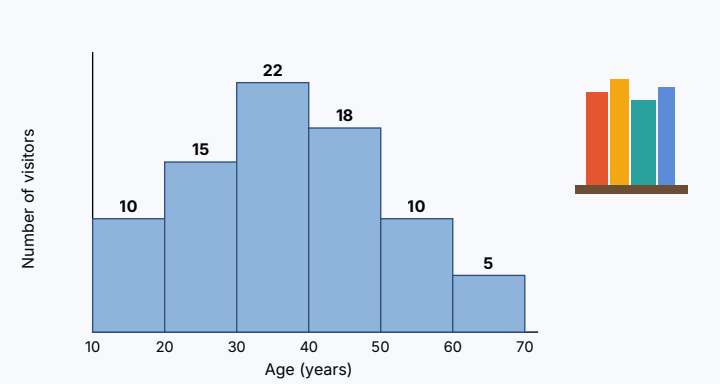
(iii) (A) Find the total salary she earns in the first 10 years. (Each year has 12 months.) **[2]**

OR

(B) Her friend joins at a monthly salary of ₹ 36,000 with a yearly increase of ₹ 1,000. In which year will both get the same monthly salary?

37. A public library recorded the ages of 80 visitors on a Sunday. The data is given in the table and shown in the histogram. **[4]**

Age (years)	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70
No. of visitors	10	15	22	18	10	5



Based on the above information, answer the following questions:

(i) Write the modal class of the data. **[1]**

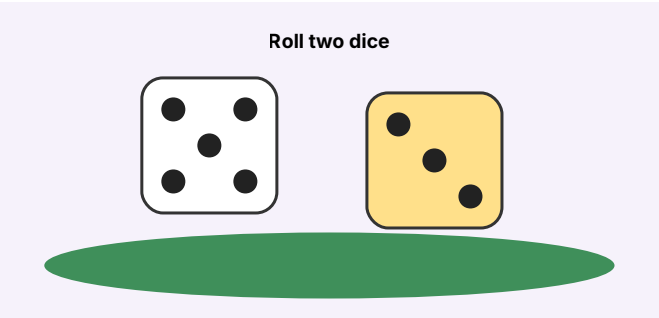
(ii) Write the median class of the data. **[1]**

(iii) (A) Find the median age of the visitors. **[2]**

OR

(B) Find the mean age of the visitors.

38. At a school fair, a game stall asks players to roll two fair dice together and look at the numbers on top. **[4]**



Based on the above information, answer the following questions:

(i) Find the probability that the sum of the two numbers is 9. **[1]**

(ii) Find the probability that the sum of the two numbers is less than 5. **[1]**

(iii) (A) Find the probability that the sum of the two numbers is a perfect square. **[2]**

OR

(B) Find the probability that the product of the two numbers is at least 20.

— End of Question Paper —