SAMPLE PAPER 1

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. If HCF(306, 657) = 9, then LCM(306, 657) is: **[1]**

(A) 2238 (B) 22338

(C) 23382 (D) 22833

2. If 2 is a zero of the polynomial $x^2 + 3x + k$, then the value of k is: **[1]**

(A) -10 (B) 10

(C) -5 (D) 5

3. The value of k for which the pair of equations $3x + ky = 9$ and $6x + 4y = 18$ has infinitely many solutions is: **[1]**

(A) -2 (B) 4

(C) 2 (D) $\frac{1}{2}$

4. The quadratic equation $2x^2 - 4x + 3 = 0$ has: **[1]**

(A) two distinct real roots (B) two equal real roots

(C) no real roots (D) more than two real roots

5. The 11th term of the A.P. $-3, -\frac{1}{2}, 2, \ldots$ is: **[1]**

(A) 28 (B) -38

(C) $-48\frac{1}{2}$ (D) 22

6. In $\triangle ABC$, D and E are points on AB and AC respectively such that DE $\parallel$ BC. If $\frac{AD}{DB} = \frac{3}{5}$ and AC = 5.6 cm, then AE is: **[1]**

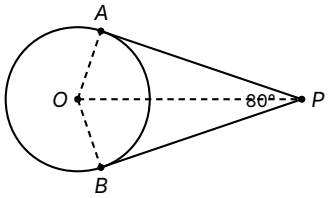
(A) 3.5 cm (B) 2.1 cm

(C) 1.8 cm (D) 2.8 cm

7. In the given figure, PA and PB are tangents to the circle with centre O. If $\angle APB = 80°$, then $\angle POA$ is: **[1]**

(A) 40° (B) 50°

(C) 80° (D) 60°



8. The value of $(\text{sec}^2\theta - 1)(\text{cosec}^2\theta - 1)$ is: **[1]**

(A) 0 (B) -1

(C) 2 (D) 1

9. The length of a tangent drawn from a point 13 cm away from the centre of a circle is 12 cm. The radius of the circle is: **[1]**

(A) 5 cm (B) 1 cm

(C) $\sqrt{313}$ cm (D) 25 cm

10. The area of a sector of a circle of radius 6 cm with central angle 60° is: **[1]**

(A) $\frac{66}{7}$ cm^2 (B) $\frac{264}{7}$ cm^2

(C) $\frac{132}{7}$ cm^2 (D) 36 cm^2

11. A cone and a cylinder have equal base radii and equal heights. The ratio of the volume of the cone to that of the cylinder is: **[1]**

(A) 1 : 3 (B) 1 : 2

(C) 3 : 1 (D) 2 : 3

12. For a distribution, mode $-$ mean $= k$(median $-$ mean). Using the empirical relationship, the value of k is: **[1]**

(A) 1 (B) 2

(C) 3 (D) $\frac{1}{3}$

13. A number is selected at random from the numbers 1 to 20. The probability that it is a prime number is: **[1]**

(A) $\frac{9}{20}$ (B) $\frac{1}{2}$

(C) $\frac{7}{20}$ (D) $\frac{2}{5}$

14. The ratio in which the y-axis divides the line segment joining the points $(5, -6)$ and $(-1, -4)$ is: **[1]**

(A) 5 : 1 (B) 1 : 5

(C) 1 : 6 (D) 6 : 1

15. If $4 \tan\theta = 3$, then the value of $\frac{4\sin\theta - \cos\theta}{4\sin\theta + \cos\theta}$ is: **[1]**

(A) $\frac{2}{3}$ (B) $\frac{1}{3}$

(C) $\frac{3}{4}$ (D) $\frac{1}{2}$

16. A ladder leaning against a vertical wall makes an angle of 60° with the ground. If the foot of the ladder is 4 m away from the wall, the length of the ladder is: **[1]**

(A) $4\sqrt{3}$ m (B) 2 m

(C) 8 m (D) $8\sqrt{3}$ m

17. The perimeter of a semicircular protractor of radius 7 cm is: **[1]**

(A) 22 cm (B) 36 cm

(C) 44 cm (D) 50 cm

18. The lower limit of the modal class of the following distribution is: **[1]**

Class	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50
Frequency	5	8	12	10	5

(A) 10 (B) 30

(C) 20 (D) 40

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):** HCF(12, 18) × LCM(12, 18) = 216. **[1]**
Reason (R): For any two positive integers a and b, HCF(a, b) × LCM(a, b) = $a \times b$.

20. **Assertion (A):** The roots of the quadratic equation $x^2 + 3x - 4 = 0$ are 1 and -4. **[1]**
Reason (R): The sum of the roots of the quadratic equation $ax^2 + bx + c = 0$ is c/a.

SECTION – B (5 × 2 = 10)

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

21(A). Find the largest number which divides 70 and 125, leaving remainders 5 and 8 respectively. **[2]**

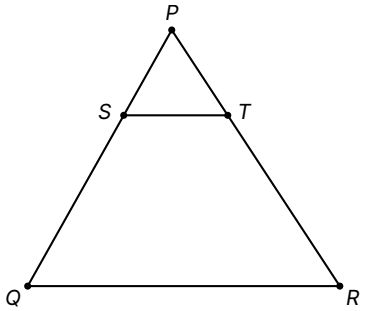
OR

21(B). Check whether 12^n can end with the digit 0 for any natural number n. Justify your answer. **[2]**

22(A). D and E are points on the sides AB and AC of $\triangle ABC$ such that AD = 4 cm, DB = 4.5 cm, AE = 8 cm and EC = 9 cm. Is DE ∥ BC? Justify your answer. **[2]**

OR

22(B). In the given figure, ST ∥ QR. If PS = 3 cm, SQ = 6 cm and ST = 4 cm, find QR. **[2]**



23. If $\cot\theta = \frac{15}{8}$, evaluate $\frac{(2 + 2\sin\theta)(1 - \sin\theta)}{(1 + \cos\theta)(2 - 2\cos\theta)}$. **[2]**

24. An arc of a circle of length 44 cm subtends an angle of 60° at the centre. Find the radius of the circle and the area of the corresponding sector. **[2]**

25. A die is thrown twice. Find the probability that (i) 5 will not come up either time, (ii) 5 will come up at least once. **[2]**

SECTION – C (6 × 3 = 18)

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

26. Prove that $\sqrt{5}$ is irrational. **[3]**

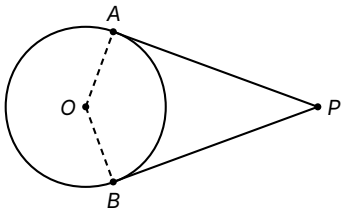
27. Find the zeroes of the quadratic polynomial $4x^2 - 4x - 15$ and verify the relationship between the zeroes and the coefficients. **[3]**

28(A). A fraction becomes $\frac{1}{3}$ when 2 is subtracted from the numerator, and it becomes $\frac{1}{2}$ when 1 is subtracted from the denominator. Find the fraction. **[3]**

OR

28(B). The sum of the digits of a two-digit number is 12. The number obtained by reversing its digits exceeds the given number by 18. Find the number. **[3]**

29. Prove that the angle between the two tangents drawn from an external point to a circle is supplementary to the angle subtended by the line segment joining the points of contact at the centre. **[3]**



30. Find the point on the x-axis which is equidistant from the points A(2, −5) and B(−2, 9). Also find this common distance. **[3]**

31(A). Prove that $\sqrt{\frac{1 + \sin A}{1 - \sin A}} + \sqrt{\frac{1 - \sin A}{1 + \sin A}} = 2 \sec A$, where A is an acute angle. **[3]**

OR

31(B). If $\sec \theta + \tan \theta = p$, prove that $\sin \theta = \frac{p^2 - 1}{p^2 + 1}$. **[3]**

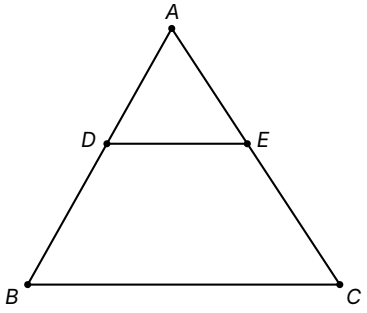
SECTION – D **(4 × 5 = 20)**

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

32. Two water taps together can fill a tank in $\frac{75}{8}$ hours. The tap of larger diameter takes 10 hours less than the smaller one to fill the tank separately. Find the time in which each tap can separately fill the tank. **[5]**

33. Prove that if a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio. **[5]**

Using the above result, solve the following: In △ABC, DE ∥ BC, with D on AB and E on AC. If AD = x cm, DB = (x − 2) cm, AE = (x + 2) cm and EC = (x − 1) cm, find the value of x.



34(A). A wooden article is made by scooping out a hemisphere from each end of a solid cylinder. The height of the cylinder is 12 cm and its base radius is 3.5 cm. Find the total surface area of the article and the volume of wood left in it. **[5]**

OR

34(B). A vessel is in the form of a hollow hemisphere of radius 21 cm, surmounted by a hollow cylinder of the same radius and height 15 cm. Find the inner surface area of the vessel and its capacity in litres. **[5]**

35(A). From the top of a 60 m high building, the angles of depression of the top and the bottom of a tower are observed to be 30° and 60° respectively. Find the height of the tower and the distance between the building and the tower. (Use $\sqrt{3}$ = 1.73) **[5]**

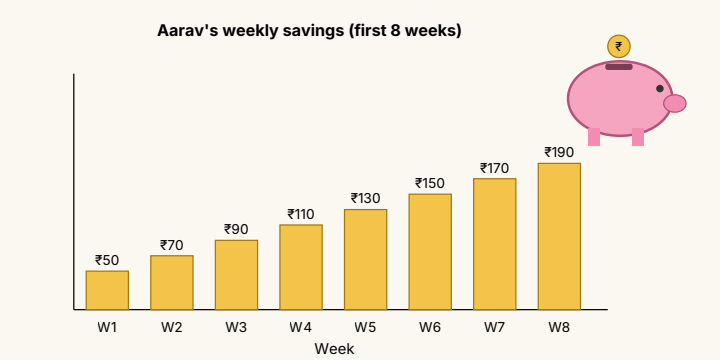
OR

35(B). From a point on the ground, the angle of elevation of the top of a vertical tower is 30°. On walking 20 m towards the tower, the angle of elevation becomes 60°. Find the height of the tower and the distance of the second point from the foot of the tower. (Use $\sqrt{3}$ = 1.73) **[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. Aarav starts saving money in a piggy bank. He saves ₹ 50 in the first week, and every week he saves ₹ 20 more than he saved in the previous week, as shown below. **[4]**



Based on the above information, answer the following questions:

(i) How much does Aarav save in the 10th week? **[1]**

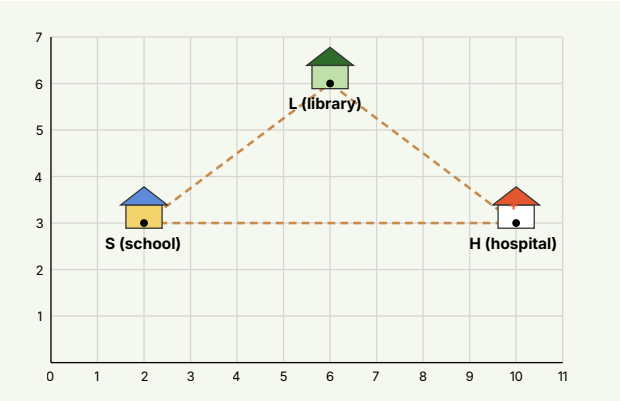
(ii) In which week does he save ₹ 450? **[1]**

(iii) (A) Find the total amount he saves in the first 20 weeks. **[2]**

OR

(B) In how many weeks will his total savings be ₹ 2850?

37. The coordinate grid below shows a town map, with 1 unit representing 1 km. The school is at S(2, 3), the library at L(6, 6) and the hospital at H(10, 3). **[4]**



Based on the above information, answer the following questions:

(i) Find the distance between the school and the library. **[1]**

(ii) A bus stop B is exactly midway between the school and the hospital. Find the coordinates of B. **[1]**

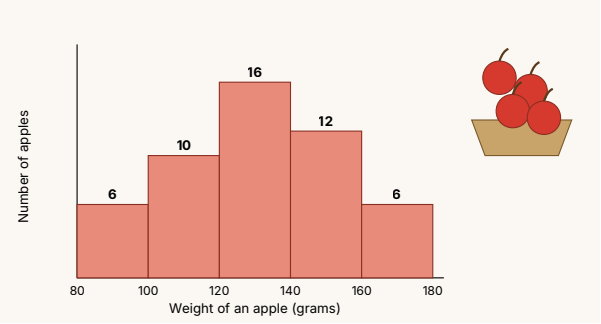
(iii) (A) Show that the library is equidistant from the school and the hospital, and find the distance of the library from the bus stop. **[2]**

OR

(B) A park P lies on SH and divides it internally in the ratio 3 : 1. Find the coordinates of P and its distance from L.

38. A fruit seller weighed 50 apples from a fresh batch. The weights are grouped in the table below and shown in the histogram. **[4]**

Weight (g)	80 – 100	100 – 120	120 – 140	140 – 160	160 – 180
No. of apples	6	10	16	12	6



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 mean weight of an apple. **[2]**

OR

(B) Find the modal weight of an apple.

— End of Question Paper —