SUBJECT: MATHEMATICS STANDARD (041)
PRE BOARD -1
CLASS – X (2026 – 27)

Maximum Marks: 80
Time Allowed: 3 hours

General Instructions:

Read the following instructions very carefully and strictly follow them:

(i) This Question paper contains 38 questions. All questions are compulsory. (ii) This Question paper is divided into five Sections – A, B, C, D and E.

(iii) In Section A, Question number 1 to 18 are Multiple Choice Questions (MCQs) and Question number 19 and 20 are Assertion - Reason based questions of 1 mark each.

(iv) In Section B, Question number 21 to 25 are Very Short Answer (VSA)-type questions, carrying 2 marks each.

(v) In Section C, Question number 26 to 31 are Short Answer (SA)-type questions carrying 3 marks each.

(vi) In Section D, Question number 32 to 35 are Long Answer (LA)-type questions carrying 5 marks each.

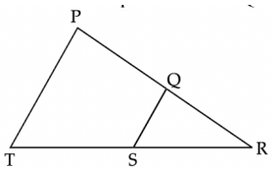
(vii) In Section E, Question number 36 to 38 are case study-based questions carrying 4 marks each.

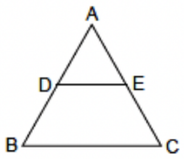
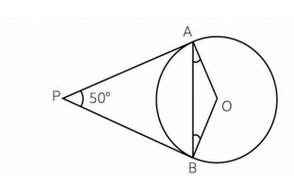
(viii) There is no overall choice. However, an internal choice has been provided in 2 questions in Section B, 2 questions in Section C and 2 questions in Section D. An internal choice has been provided in all the sub parts having 2 marks of questions in section E.

(ix) Draw neat and clean figures wherever required. Take π =22/7 wherever required, if not stated. (x) Use of calculators is not allowed.

SECTION – A (20 x 1 = 20)

This section comprises 18 multiple choice questions and two questions of assertion and reasoning type of 1 mark each.

Q. No.	Questions	Marks
1.	What is the value of k such that the following pair of equations have infinitely many solutions? x – 2y = 3 and – 3x + ky = – 9. (a) (–6) (b) –3 (c) 3 (d) 6	**1**
2.	In the following figure, Q is a point on PR and S is a point on TR. QS is drawn and ∠RPT = ∠RQS. Which of these criteria can be used to prove that ΔRSQ is similar to ΔRTP?  (a) AAA similarity criterion (b) SAS similarity criterion (c) SSS similarity criterion (d) RHS similarity criterion	**1**
3.	The sum of the first 16 terms of the A.P.: 10, 6, 2, ... is: (a) 320 (b) –320 (c) –352 (d) –400	**1**
4.	The value(s) of k for which the quadratic equation $2x^2 + kx + 2 = 0$ has equal roots, is (a) 4 (b) ± 4 (c) – 4 (d) 0	**1**
5.	The common difference of an A.P., whose nth term is a_n = (3n + 7), is: (a) 3 (b) 7 (c) 10 (d) 6	**1**
6.	The pair of linear equations (3/2)x + (5/3)y = 7 and 9x + 10y = 14 is (a) consistent (b) inconsistent (c) consistent with one solution (d) consistent with many solutions	**1**

7.	The point which lies on the perpendicular bisector of the line segment joining the points A (– 3, – 4) and B (3, 4) is: (A) (0, 0) (B) (0, 3) (C) (3, 0) (D) (0, 4)	**1**
8.	In the given figure, DE || BC, AE = a units, EC = b units, DE = x units and BC = y units. Which of the following is true?  (a) $x = \frac{a+b}{ay}$ (b) $y = \frac{ax}{a+b}$ (c) $x = \frac{ay}{a+b}$ (d) $\frac{x}{y} = \frac{a}{b}$	**1**
9.	Sachin has a 40 cm long red and 84 cm long blue ribbon. He cuts each ribbon into pieces such that all pieces are of equal length. What is the length of each piece? (a) 4 cm as it is the HCF of 40 and 84 (b) 4 cm as it is the LCM of 40 and 84 (c) 12 cm as it is the LCM of 40 and 84 (d) 12 cm as it is the HCF of 40 and 84	**1**
10	$(\sec^2\theta - 1)(\text{cosec}^2\theta - 1)$ is equal to: (a) –1 (b) 1 (c) 0 (d) 2	**1**
11.	The coordinate of point P on X-axis equidistant from the points A (–1, 0) and B (5, 0) is (a) (2, 0) (b) (0, 2) (c) (3, 0) (d) (2, 2)	**1**
12.	Given that $\sin\alpha = 1/2$ and $\cos\beta = 1/2$, then the value of $(\beta - \alpha)$ is (a) 0° (b) 30° (c) 60° (d) 90°	**1**
13.	Two parallel lines touch the circle at points A and B respectively. If area of the circle is 25π cm², then AB is equal to (a) 5 cm (b) 8 cm (c) 10 cm (d) 25 cm	**1**
14.	The zeroes of the quadratic polynomial $x^2 + 25x + 156$ are (a) both positive (b) both negative (c) one positive and one negative (d) can't be determined	**1**
15.	In the figure, if PA and PB are tangents to the circle with centre O such that $\angle APB = 50°$, then $\angle OAB$ is:  (a) 25° (b) 30° (c) 40° (d) 50°	**1**
16.	The area of the circle that can be inscribed in a square of 6 cm is: (a) 36π cm² (b) 18π cm² (c) 12π cm² (d) 9π cm²	**1**
17.	If the sum of the zeroes of the quadratic polynomial $kx^2 + 4x + 3k$ is equal to their product, then the value of k is (a) -3/4 (b) 3/4 (c) 4/3 (d) -4/3	**1**

18.	A rectangular block 6 cm × 12 cm × 15 cm is cut into an exact number of equal cubes. The least possible number of cubes will be (a) 6 (b) 11 (c) 33 (d) 40	**1**

	Assertion-Reason Based Questions **Directions: Questions number 19 and 20 are Assertion and Reason based questions carrying 1 mark each. Two statements are given, one labelled Assertion (A) and the other labelled Reason (R).** **Select the correct answer from the options (A), (B), (C) and (D) as given below:** **(A)** Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A). **(B)** Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A). **(C)** Assertion (A) is true but Reason (R) is false. **(D)** Assertion (A) is false but Reason (R) is true.	
19.	**Assertion (A)**: The equation $x^2 + 3x + 1 = (x - 2)^2$ is a quadratic equation. **Reason (R)**: Any equation of the form $ax^2 + bx + c = 0$ where $a \neq 0$, is called a quadratic equation	**1**
20.	**Assertion (A)**: 6^n ends with the digit zero, where n is natural number. **Reason (R)**: Any number ends with digit zero, if its prime factor is of the form $2^m \times 5^n$, where m, n are natural numbers.	**1**
	SECTION – B (5 x 2 = 10) **This section comprises 5 Very Short Answer (VSA) type questions of 2 marks each**.	
21(A).	There is a circular path around a sports field. Sonia takes 18 minutes to drive one round of the field, while Ravi takes 12 minutes for the same. Suppose they both start at the same point and at the same time, and go in the same direction. After how many minutes will they meet again at the starting point?	**2**
	OR	
21(B).	There are three bells placed at different swings in a park, which toll at intervals of 5, 6 and 8 minutes, respectively. They all toll together when the park opens for the visitors at 10:00 a.m.. How many more times do they all toll together till the park is closed at 7:00 p.m.?	
22(A).	Evaluate : $2\tan^2 45° + \cos^2 30° - \sin^2 60°$	**2**
	OR	
22(B).	If $\tan(A + B) = \sqrt{3}$ and $\tan(A - B) = \frac{1}{\sqrt{3}}$; $0° < A + B \ 90°$; $A > B$, find A and B	

23.	Determine the AP whose 3rd term is 5 and the 7th term is 9.	**2**
24.	Find the coordinates of the point of trisection of the line segment joining (1, –2) and (–3, 4).	**2**
25.	If the product of the zeroes of the polynomial $ax^2 - 6x - 6$ is 4, then find the value of a. Also find the sum of zeroes of the polynomial.	**2**
	SECTION – C (6 x 3 = 18) **This section comprises 6 Short Answer (SA) type questions of 3 marks each**.	
26.	Prove that $\sqrt{5}$ is an irrational number	**3**

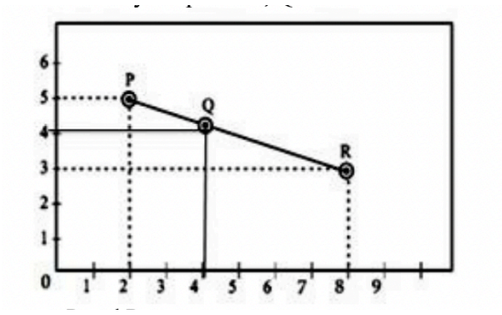
27.	Find the zeroes of the quadratic polynomial $2x^2 - x - 6$ and verify the relationship between the zeroes and the coefficients of the polynomial.	**3**
28(A).	Prove that the parallelogram circumscribing a circle is a rhombus.	**3**
	OR	
28(B).	Two concentric circles are of radii 5 cm and 3 cm. Find the length of the chord of the larger circle which touches the smaller circle.	
29.	A man on the deck of a ship, 12 m above water level, observes that the angle of elevation of the top of a cliff is 60° and the angle of depression of the base of the cliff is 30°. Find the distance of the cliff from the ship and the height of the cliff. [Use $\sqrt{3} = 1.732$]	**3**
30.	The sum of two numbers is 34. If 3 is subtracted from one number and 2 is added to another, the product of these two numbers becomes 260. Find the numbers.	**3**
31(A).	Prove any one of the given identities, where the angles involved are acute angles for which the expressions are defined. $(\sin A + \text{cosec } A)^2 + (\cos A + \sec A)^2 = 7 + \tan^2 A + \cot^2 A$	**3**
	OR	
31(B).	$(\sin\theta - 2\sin^3\theta) / (2\cos^3\theta - \cos\theta) = \tan\theta$	**3**

	SECTION – D (4 x 5= 20) **This section comprises 4 Long Answer (LA) type questions of 5 marks each**.	
32.	Determine graphically the co-ordinates of the vertices of a triangle formed by these lines, whose equations are given by $2y - x = 8$, $5y - x = 14$ and $y - 2x = 1$.	**5**
33.	a) State and prove the Basic Proportionality Theorem(BPT) b) ABCD is a trapezium with AB || DC. E and F are points on non-parallel sides AD and BC respectively such that EF is parallel to AB . Show that $\frac{AE}{ED} = \frac{BF}{FC}$	**3+2**
34(A).	There are two identical solid cubical boxes of side 7 cm. From the top face of the first cube a hemisphere of diameter equal to the side of the cube is scooped out. This hemisphere is inverted and placed on the top of the second cube's surface to form a dome. Find : (a) the ratio of the total surface area of the two new solid formed. (b) volume of each new solid formed.	**5**
	OR	
34(B).	A rocket is in the form of a right circular cylinder closed at the lower end and surmounted by a cone with the same radius as that of the cylinder. The diameter and height of the cylinder are 6 cm and 12 cm, respectively. If the slant height of the conical portion is 5 cm, find the total surface area and volume of the rocket [Use = 3.14].	
35(A).	Find the area of the sector of a circle with radius 4 cm and of angle 30°. Also, find the area of the corresponding major sector (Use = 3.14).	**5**
	OR	

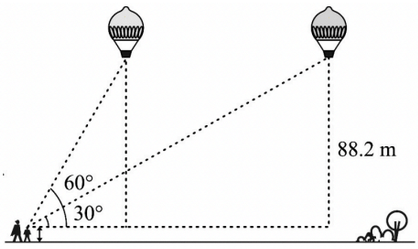
35(B).	A chord of a circle of radius 10 cm subtends a right angle at the centre. Find the area of the corresponding : (i) minor segment (ii) major sector. (Use = 3.14)	

SECTION – E (3 x 4 = 12)

This section comprises 3 case-study-based questions of 4 marks each with sub parts.

36.	A group of class X students goes on a picnic during winter holidays. The position of three friends Rachana, Kailash and Varun are shown by the points P, Q and R  (i) Find the distance between P and R. (ii) Is Q, the midpoint of PR? Justify by finding the midpoint of PR. (iii) Find the point on the x-axis which is equidistant from P and Q. OR Let S be a point which divides the line joining PQ in ratio 2:3. Find the coordinates of S.	**1** **1** **2**

37.	In the month of April to June 2022, the exports of passenger cars from India increased by 26% in the corresponding quarter of 2021–22, as per a report. A car manufacturing company planned to produce 1800 cars in 4th year and 2600 cars in 8th year. Assuming that the production increases uniformly by a fixed number every year.  Based on the above information, answer the following questions. (i) Find the production in the 1st year. (ii) Find the production in the 12th year. (iii) Find the total production in the first 10 years. OR (iii) In how many years will the total production reach 31200 cars?	**1** **1** **2**

38.	A 1.2 m tall girl spots a balloon moving with the wind in a horizontal line at a height of 88.2 m from the ground. The angle of elevation of the balloon from the eyes of the girl at any instant is 60°. After 30 seconds, the angle of elevation reduces to 30° (see the below figure).  Based on the above information, answer the following questions. (Take $\sqrt{3}$ =1.732) (i) Find the distance travelled by the balloon during the interval. (ii) Find the speed of the balloon. OR (ii) If the elevation of the sun at a given time is 30°, then find the length of the shadow cast by a tower of 150 feet height at that time.	**2** **2**