INFINITY THINK BEYOND.....
AN EDUCATIONAL INSTITUTE

Class X Session 2024-25
MATHEMATICS STANDARD (SET – 01)
(Code No.041)

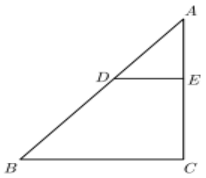
TIME: 3 hours **MAX.MARKS: 80**

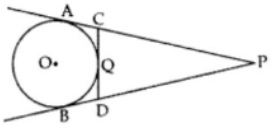
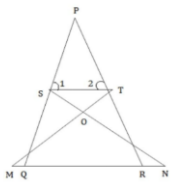
General Instructions:

Read the following instructions carefully and follow them:

1. This question paper contains 38 questions.
2. This Question Paper is divided into 5 Sections A, B, C, D and E.
3. In Section A, Questions no. 1-18 are multiple choice questions (MCQs) and questions no. 19and 20 are Assertion- Reason based questions of 1 mark each.
4. In Section B, Questions no. 21-25 are very short answer (VSA) type questions, carrying 02 markseach.
5. In Section C, Questions no. 26-31 are short answer (SA) type questions, carrying 03 marks each.
6. In Section D, Questions no. 32-35 are long answer (LA) type questions, carrying 05 marks each.
7. In Section E, Questions no. 36-38 are case study based questions carrying 4 marks each with sub parts of the values of 1, 1 and 2 marks each respectively.
8. All Questions are compulsory. However, an internal choice in 2 Questions of section B, 2 Questions of section C and 2 Questions of section D has been provided. And internal choice hasbeen provided in all the 2 marks questions of Section E.
9. Draw neat and clean figures wherever required.
10. Take π =22/7 wherever required if not stated.
11. Use of calculators is not allowed.

	Section A.	
	Section A consists of 20 questions of 1 mark each.	
1	If a pair of linear equations is consistent, then the lines will be: (A) Parallel (B) always coincident (C) intersecting or coincident (D) always intersecting	**1**
2	3 chairs and 1 table cost Rs.900; whereas 5 chairs and 3 tables cost Rs.2,100. If the cost of 1 chair is Rs.x and the cost of 1 table is Rs.y , then the situation can be represented algebraically as (A) 3x + y = 900; 3x + 5y = 2100 (B) x + 3y = 900; 3x + 5y = 2100 (C) 3x + y =900; 5x + 3y = 2100 (D) x + 3y = 900; 5x + 3y =2100	**1**
3	The quadratic equation $x^2 - 4x + 3\sqrt{2} = 0$ has (A) no real roots (B) two equal real roots (C) two distinct real roots (D) more than 2 real roots	**1**
4	If one root of the quadratic equation $ax^2 + bx + c = 0$ is the reciprocal of the other, then (A) b = c (B) a = b (C) ac = 1 (D) a = c	**1**
5	The volume of a right circular cone whose area of the base is 156 cm^2 and the vertical height is 8 cm, is: (A) 2496 cm^3 (B) 1248 cm^3 (C) 1664 cm^3 (D) 416 cm^3	**1**
6	The circumferences of two circles are in the ratio 4 : 5. What is the ratio of their radii ? (A) 16 : 25 (B) 4:5 (C) $2:\sqrt{5}$ (D) 25:16	**1**

7	If the perimeter of a semi-circular protractor is 36 cm, then its diameter is (A) 10 cm (B) 14 cm (C) 12 cm (D) 16 cm	**1**
8	From an external point Q, the length of tangent to a circle is 12 cm and the distance of Q from the centre of circle is 13 cm. The radius of circle (in cm) is (A) 5 (B) 10 (C) 12 (D)7	**1**
9	A tree casts a shadow 15 m long on the level of ground, when the angle of elevation of the sun is 45^0. The height of a tree is (A) 10 cm (B) 14 cm (C) 8 cm (D) 15 cm	**1**
10	For A = 30^0, the value of 2 sinA cosA is (A)1 (B) $\frac{\sqrt{3}}{2}$ (C) $\frac{\sqrt{3}}{4}$ (D)$\frac{3}{2}$	**1**
11	If sinA – cosA = 0 , then the value of ($\sin^4A + \cos^4A$) is (A) 1 (B)$\frac{1}{2}$ (C) $\frac{1}{4}$ (D)$\frac{3}{4}$	**1**
12	If sinα =$\frac{1}{2}$ and cosβ = $\frac{1}{2}$, then the value (α + β) is (A) 90^0 (B) 30^0 (C) 60^0 (D) 0^0	**1**
13	The point of intersection of the line represented by 3x - y = 3 and y -axis is given by (A) (0, –3) (B) (0, 3) (C) (2, 0) (D) (–2, 0)	**1**
14	The distance between the points (cosA, sinA) and (sinA, -cosA) is (A) $\sqrt{3}$ (B) $\sqrt{2}$ (C) 2 (D) 1	**1**
15	One card is drawn at random from a well shuffled deck of 52 playing cards. The probability that it is a red ace card, is (A) $\frac{1}{13}$ (B) $\frac{1}{2}$ (C) $\frac{1}{26}$ (D) $\frac{1}{52}$	**1**
16	In the given figure, DE II BC. If AD = 3 cm, AB = 7 cm and EC = 3 cm, then the length of AE is  (A) 2 cm (B) 2.25 cm (C) 3.5cm (D) 4cm	**1**
17	The point A(-5,6) is at a distance of (A) $\sqrt{61}$ units from origin (B) $\sqrt{11}$ units from origin (C) 61 units from origin (D) 11 units from origin	**1**
18	The largest number which divides 70 and 125 ,leaving remainders 5 and 8 respectively is (A)13 (B) 9 (C) 3 (D) 585	**1**
19	Assertion (A) : If n^{th} term of an AP is 7 - 4n, then its common differences is -4. Reason (R) : Common difference of an AP is given by d = $a_{(n+1)} - a_n$. (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	**1**
20	Assertion(A) : Two identical solid cube of side 5cm are joined end to end. Then total surface area of the resulting cuboid is 300sq.cm	**1**

	Reason(R) : Total surface area of a cuboid is 2(lb + bh + lh). (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	
SECTION B		
SECTION B CONSISTS OF 5 QUESTIONS OF 2 MARKS EACH		
21	In the given fig. PA and PB are tangents to the circle from an external point P.CD is another tangent touching the circle at question .If PA = 12 cm , QC = QD = 3cm , then find PC + PD .  	**2**
22	If α *and* β be the zeroes of the polynomial f(x) = $kx^2 + 2x - 15$, such that $\alpha^2 + \beta^2 = 34$ .Then find the value of k .	**2**
23 (A)	A horse is tethered to one corner of a rectangular field of dimensions 70m x 52m, by a rope of length 21 m. How much area of the field can it graze?	**2**
	OR	
23(B)	In a circle of radius 21 cm, an arc subtends an angle of 60^0 at the centre. Find the area of sector formed by the arc.	**2**
24	If two adjacent vertices of parallelogram are (3,2) and (-1 , 0) and the diagonals intersect at (2,-5) ,then find the coordinates of the two other vertices .	**2**
25(A)	If AD and PM are medians of triangles ABC and PQR, respectively where Δ ABC ~ Δ PQR, prove that $\frac{AB}{PQ} = \frac{AD}{PM}$	**2**
	OR	
25(B)	If $\angle 1 = \angle 2$ and $\Delta NSQ \cong \Delta MTR$, then prove that $\Delta PTS \sim \Delta PRQ$  	**2**
SECTION C		
SECTION C CONSISTS OF 6 QUESTIONS OF 3 MARKS EACH		
26(A)	If x = r SinACosC; y = r SinASinC and z = r CosA, Prove that: $x^2 + y^2 + z^2 = r^2$.	**3**
	OR	
26(B)	Prove that: $(\text{Cosec}\,\theta + \text{Cot}\,\theta)^2 = \frac{\text{Sec}\theta + 1}{\text{Sec}\theta - 1}$	**3**
27(A)	Find the median of the following data :	**3**

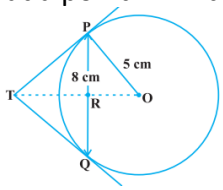
Marks	Less than 10	Less than 20	Less than 30	Less than 40	Less than 50	Less than 60	Less than 70	Less than 80
Frequency	0	10	25	43	65	87	96	100

	OR	

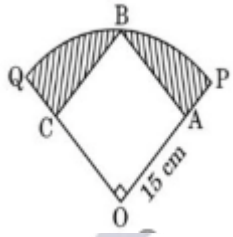
27(B) If the median of the following distribution is 46, find the missing frequencies p and q. **3**

Class intervals	10 - 20	20-30	30-40	40-50	50-60	60-70	70-80	Total
Frequency	12	30	x	65	y	25	18	

28 PQ is a chord of length 8 cm of a circle of radius 5 cm. The tangents at P and Q intersect at a point T. Find the length of the tangent TP. **3**



29 In the fig. a square OABC is inscribed in a quadrant OPBQ .If OA = 15 cm , find the area of the shaded region .($\pi = 3.14$) **3**



30 All red face cards are removed from a pack of playing cards. The remaining cards are well shuffled and then a card is drawn at random from them. Find the probability that the drawn card is: **3**
(i) a red card (ii) a face card (iii) a card of clubs

31 Prove that $a_{m+n} + a_{m-n} = 2a_m$. **3**

SECTION D

SECTION D CONSISTS OF 4 QUESTIONS OF 5 MARKS EACH

32(A) How many terms of the Arithmetic Progression 45, 39, 33, ... must be taken so that their sum is 180? Explain the double answer. **5**

OR

32(B) The sum of four consecutive numbers in an AP is 32 and the ratio of the product of the first and the last term to the product of two middle terms is 7:15. Find the numbers. **5**

33(A) In a flight of 600 km, an aircraft was slowed down due to bad weather. The average speed of the trip was reduced by 200 km/hr and the time of flight increased by 30 minutes. Find the duration of the flight. **5**

OR

33(B) Find the values of k for which the equation $(3k + 1)x^2 + 2(k + 1)x + 1 = 0$ has equal roots. Also find the roots. **5**

34 Sides AB, AC and median AD of a ΔABC are respectively proportional to sides PQ ,PR and median PS of another triangle PQR .Show that $\Delta ABC \sim \Delta PQR$ **5**

35 The angle of elevation of a cloud from a point 200m above the lake is 30^0 and the angle of depression of the reflection of the cloud in the lake is 60^0 , find the height of the cloud above the lake? **5**

SECTION E.

36 In a coffee shop, coffee is served in two types of cups. One is cylindrical in shape with diameter 7 cm and height 14 cm and the other is hemispherical with diameter 21 cm.

	Based on the above information, solve the following questions:(use π = 22/7) 	
(I)	Find the area of the base of the cylindrical cup.	**1**
(II)(A)	(a) What is the capacity of the hemispherical cup? OR	**1**
(II)(B)	Find the capacity of the cylindrical cup.	**1**
(III)	what is the curved surface area of the cylindrical cup?	**2**
37	A leading LED TV manufacturing company manufactures 18000 LED TVs in the second year and 19800 LED Tvs in tenth year. Assuming that the company increases the manufacturing of LED TV uniformly every year by fixed numbers.  Based on the above answer the following :	
(I)	How much, the manufacturing of LED TV is increased every year ?	**1**
(II)	How many LED TVs were manufactured in the seventh year ?	**1**
(III)(A)	How many LED TVs were manufactured in ten years ? OR	**2**
(III)(B)	If company is 12 year old, find number of LED TVs produced in last 3 years.	**2**
38	Rahul and Ravi planned to play Business (board game) in which they were supposed to use two dice.  	
(I)	Ravi got first chance to roll the dice. What is the probability that he got the sum of the two numbers appearing on the top face of the dice is 8?	**1**
(II)	Rahul got next chance. What is the probability that he got the sum of the two numbers appearing on the top face of the dice is 13?	**1**
(III)(A)	Now it was Ravi's turn. He rolled the dice. What is the probability that he got the sum of the two numbers appearing on the top face of the dice is less than or equal to 12? OR	**2**
(III)(B)	Now it was Rahul's turn. He rolled the dice. What is the probability that he got the sum of the two numbers appearing on the top face of the dice is greater than 8?	**2**