Class X Mathematics –Standard (041)
Sample Question Paper 3 2019-20

Max. Marks: 80 Duration : 3 hrs

General Instructions:

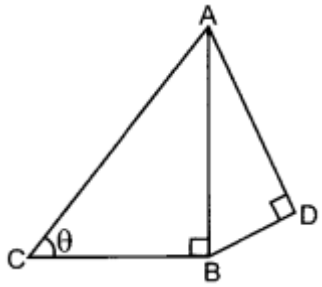
(i) All the questions are compulsory.
(ii) The question paper consists of 40 questions divided into 4 sections A, B, C, and D.
(iii) Section A comprises of 20 questions of 1 mark each. Section B comprises of 6 questions of 2 marks each. Section C comprises of 8 questions of 3 marks each. Section D comprises of 6 questions of 4 marks each.
(iv) There is no overall choice. However, an internal choice has been provided in two questions of 1 mark each, two questions of 2 marks each, three questions of 3 marks each, and three questions of 4 marks each. You have to attempt only one of the alternatives in all such questions.
(v) Use of calculators is not permitted.

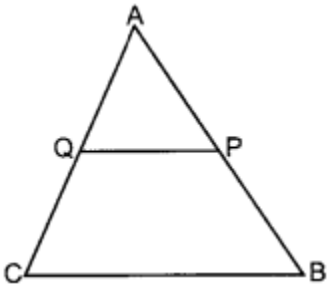
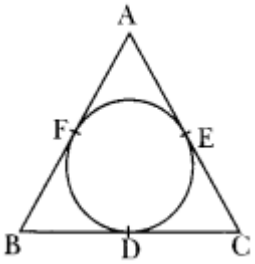
SECTION A		
Q 1- Q 10 are multiple choice questions. Select the most appropriate answer from the given options.		
1	Which term of the sequence 114,109,104 … is the first negative term? a) 23 b) 24 c) 25 d) 13	1

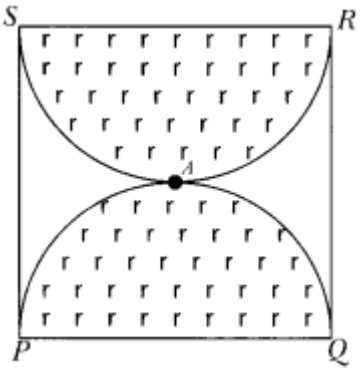
2		1
	For what value of k the quadratic equation $x^2 - kx + 4 = 0$ has equal roots? a) +4 b) -4 c) 0 d) +4 or -4	
3	The Given that $\tan\theta = 1/\sqrt{5}$. What is the value of $(\text{Cosec}^2\theta - \text{Sec}^2\theta) / (\text{Cosec}^2\theta + \text{Sec}^2\theta)$ a) 2/3 b) 1/3 c) 4/3 d) 3/2	1
4	Find a point on the y-axis which is equidistant from the points A (6,5) and B (- 4, 3) a) (1,9) b) (0,9) c) (2,4) d) (3,9)	1
5	Express sin 67° + cos 75° in terms of trigonometric ratios of angles between 0° and 45°.	1

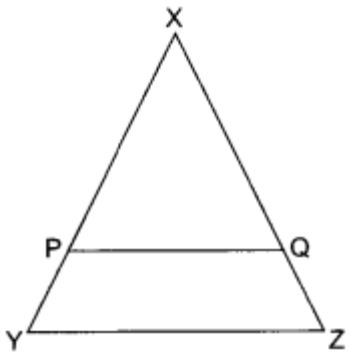
6	Find the common difference of an AP in which $a_{18} - a_{14} = 32$. a) 4 b) 8 c) 10 d) -4	1
7	Two dice are thrown at the same time and the product of numbers appearing on them is noted. Find the probability that the product is a prime number. a) 1/6 b) 5/6 c) 3/6 d) 2/6	1
8	Can the number 4^n, n being a natural number, end with the digit 0? Give reason.	1
9	The nature of roots of the quadratic equation $4x^2 - 12x - 9 = 0$ is a) real b) equal c) imaginary d) real and equal	1

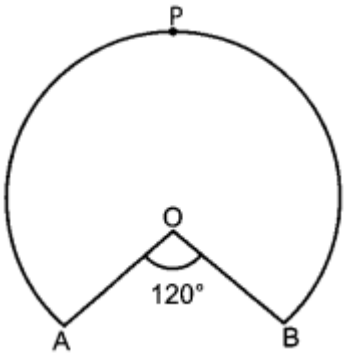
10	If tan A = 3/4 and A + B = 90°, then what is the value of cot B? a) −1 b) −3/4 c) 3/4 d) 4/3	1
(Q 11- Q 15) Fill in the blanks		
11	The total number of natural numbers between 101 and 999 which are divisible by both 2 and 5 are _____	1
12	A child has a die whose six faces show the letters as given below: A B C D E A The die is thrown once. What is the probability of getting (i) A? (ii) D?	1
13	Find the ratio in which the line joining the points (6, 4) and (1, –7) is divided by x-axis.	1

14	If A = 2n + 13, B = n + 7, where n is a natural number then HCF of A and B is:	1
15	If three coins are tossed simultaneously, than the probability of getting at least two heads, is	1
(Q 16- Q 20) Answer the following		
16	A toy is in the form of a cone mounted on a hemisphere of common base radius 7 cm. The total height of the toy is 31 cm. Find the total surface area of the toy.	1
17	Write the zeros of the polynomial $x^2 + 2x + 1$.	1
18	The n^{th} term of an AP is 7 – 4n. Find its common difference. OR The length of tangent from a point A at distance 13cm from centre of circle is 12cm. Find the diameter of circle.	1
19	In the given figure, AD = 4 cm, BD = 3 cm and CB = 12 cm. Find cot θ.  	1
20	In the given figure, P and Q are points on the sides AB and AC respectively of ∆ABC such that AP = 3.5 cm, PB = 7 cm, AQ = 3 cm and QC = 6 cm. If PQ = 4.5 cm, find BC	1

		
	Section – B	
21	A die is thrown once. Find the probability of getting 1. a prime number. 2. a number divisible by 2.	2
22	Find the 25th term of the AP: -5, -5/2 , 0, 5/2 …..	2
23	The incircle of △ABC touches the sides BC, CA and AB at D, E, and F respectively. If AB = AC, prove that BD = CD.  OR Write whether the square of any positive integer can be of the form 3m + 2, where m is a natural number. Justify your answer.	2
24	Find the zeros of the quadratic polynomial x^2 + 5x+ 6 and verify the relationship between the zeros and the coefficients.	2

25	All cards of ace, jack and queen are removed from a deck of playing cards. One card is drawn at random from the remaining cards. Find the probability that the card drawn is 1. a face card. 2. not a face card. OR For what value of 'k' will the following pair of linear equations have infinitely many solutions? $kx + 3y = k - 3$ $12x + ky = k$	2
26	Two spheres of same metal weigh 1 kg and 7 kg. The radius of the smaller sphere is 3 cm. The two spheres are melted to form a single big sphere. Find the diameter of the new sphere.	2
	Section C	
27	Prove that $5 + \sqrt{2}$ is an irrational number. OR PQRS is a square land of side 28 m. Two semicircular grass covered portions are to be made on two of its opposite sides as shown in the figure. How much area will be left uncovered? $(Take \Pi = \frac{22}{7})$  	3

28	Determine an AP whose 3rd term is 16 and when 5th term is subtracted from 7th term, we get 12.	3
29	If the price of petrol is increased by ₹2 per litre, a person will have to buy 1 litre less petrol for ₹1740. Find the original price of petrol at that time.	3
30	In figure, $\frac{XP}{PY} = \frac{XQ}{QZ} = 3$, if the area of ΔXYZ is 32 cm^2, then find the area of the quadrilateral PYZQ 	3
31	Find a relation between x and y such that the point P (x, y) is equidistant from the points A (2,5) and B (-3, 7).	3
32	Prove that following $\frac{sin\theta}{cot\theta+cosec\theta} = 2 + \frac{sin\theta}{cot\theta-cosec\theta}$	3
33	In figure, OAPB is a sector of a circle of radius 3.5 cm with the centre at O and $\angle AOB = 120°$. Find the length of OAPBO.	3



34 The distribution below gives the weights of 30 students of a class. Find the median weight of the students. 3

Weight (in kg)	40-45	45-50	50-55	55-60	60-65	65-70	70-75
Number of students	2	3	8	6	6	3	2

Section – D

35 From the top and foot of a tower 40m high, the angle of elevation of the top of a lighthouse is found to be 30° and 60° respectively. Find the height of the lighthouse. Also find the distance of the top of the lighthouse from the foot of the tower. 4

OR

If $x\sin^3\theta + y\cos^3\theta = \sin\theta\cos\theta$ and $x\sin\theta = y\cos\theta$, prove $X^2 + y^2 = 1$.

36 A solid is composed of a cylinder with hemispherical ends. If the whole length of the solid is 100cm and the diameter of the hemispherical ends is 28cm. Find the cost of polishing the surface of the solid at the rate of 5 paise per sq.cm. 4

37	Prove that in a triangle, if the square of one side is equal to the sum of the squares of the other two sides, the angle opposite to the first side is a right angle. Using the converse of above, determine the length of an altitude of an equilateral triangle of side 2 cm. OR Find value of k so that the following quadratic equation has equal roots: $2x^2-(k-2)x+1=0$	4
38	300 oranges are distributed equally among a certain number of students. Had there been 10 more students, each would have received 1 orange less. Find the number of students. OR In a school, students decided to plant trees in and around the school to reduce air pollution. It was decided that the number of trees, that each section of each class will plant, will be double of the class in which they are studying. If there are 1 to 12 classes in the school and each class has two sections, find how many trees were planted by the students. Which value is shown in this question?	4
39	Construct a circle whose radius is equal to 4 cm. Let P be a point whose distance from its centre is 6 cm. Construct two tangents to it from P.	4
40	The mean of the following frequency table is 53. But the frequencies f_1 and f_2 in the classes 20-40 and 60-80 are missing. Find the missing frequencies.	4

Age (in years)	0-20	20-40	40-60	60-80	80-100	Total
Number of People	15	f_1	21	f_2	17	100

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