Class X
Mathematics
Sample Question Paper 2018-19

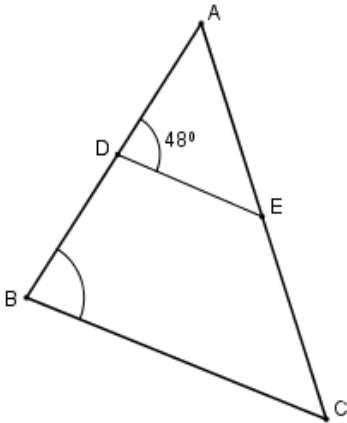**Time allowed: 3 Hours**   **Max. Marks: 80**

General Instructions:
1. All the questions are compulsory.
2. The questions paper consists of 30 questions divided into 4 sections A, B, C and D.
3. Section A comprises of 6 questions of 1 mark each. Section B comprises of 6 questions of 2 marks each. Section C comprises of 10 questions of 3 marks each. Section D comprises of 8 questions of 4 marks each.
4. 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, four 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.
5. Use of calculators is not permitted.

Section-A		
1.	Find the value of a, for which point P ($\frac{a}{3}$, 2) is the mid-point of the line segment joining the points Q(-5,4) and R(-1,0).	1
2.	Find the value of k, for which one root of the quadratic equation $kx^2-14x+8 = 0$ is 2.	1
	OR	
	Find the value(s) of k for which the equation $x^2 + 5kx + 16 = 0$ has real and equal roots.	
3.	Write the value of $\cot^2\theta - \frac{1}{\sin^2\theta}$	1
	OR	
	If $sin\theta = cos\theta$, then find the value of $2\tan\theta + \cos^2\theta$	
4.	If nth term of an A.P. is (2n+1), what is the sum of its first three terms?	1
5.	In figure if AD= 6cm, DB=9cm, AE = 8cm and EC = 12cm and $\angle ADE = 48^0$. Find $\angle ABC$	1
6.	After how many decimal places will the decimal expansion of $\frac{23}{2^4 \times 5^3}$ terminate?	1

|	**Section-B**	
7.	The HCF and LCM of two numbers are 9 and 360 respectively. If one number is 45, find the other number.	**2**
	OR	
	Show that $7 - \sqrt{5}$ is irrational, give that $\sqrt{5}$ is irrational.	
8.	Find the 20th term from the last term of the AP 3,8,13,….,253	**2**
	OR	
	If 7 times the 7th term of an A.P is equal to 11 times its 11th term, then find its 18th term.	
9.	Find the coordinates of the point P which divides the join of A(-2,5) and B(3,-5) in the ratio 2:3	**2**
10.	A card is drawn at random from a well shuffled deck of 52 cards. Find the probability of getting neither a red card nor a queen.	**2**
11.	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	**2**
12.	For what value of p will the following pair of linear equations have infinitely many solutions $\quad$ (p-3)x+3y = p $\quad$ px+py = 12	**2**
	Section-C	
13.	Use Euclid's Division Algorithm to find the HCF of 726 and 275.	**3**
14.	Find the zeroes of the following polynomial: $5\sqrt{5}x^2+30x+8\sqrt{5}$	**3**
15.	Places A and B are 80 km apart from each other on a highway. A car starts from A and another from B at the same time. If they move in same direction they meet in 8 hours and if they move towards each other they meet in 1 hour 20 minutes. Find the speed of cars.	**3**
16.	The points A(1,-2) , B(2,3), C (k,2) and D(-4,-3) are the vertices of a parallelogram. Find the value of k.	**3**
	OR	
	Find the value of k for which the points (3k-1,k-2), (k,k-7) and (k-1,-k-2) are collinear.	
17.	Prove that $\quad cot\theta - tan\theta = \dfrac{2cos^2\theta-1}{sin\theta cos\theta}$	**3**
	OR	
	Prove that $sin\theta(1 + tan\theta) + cos\theta(1 + cot\theta) = sec\theta + cosec\theta$	
18.	The radii of two concentric circles are 13 cm and 8 cm. AB is a diameter of the bigger circle and BD is a tangent to the smaller circle touching it at D and intersecting the larger circle at P on producing. Find the length of AP.	**3**

19.	In figure ∠1 = ∠2 and ΔNSQ ≅ ΔMTR, then prove that ΔPTS∼ΔPRQ.	3

<div align="center">**OR**</div>
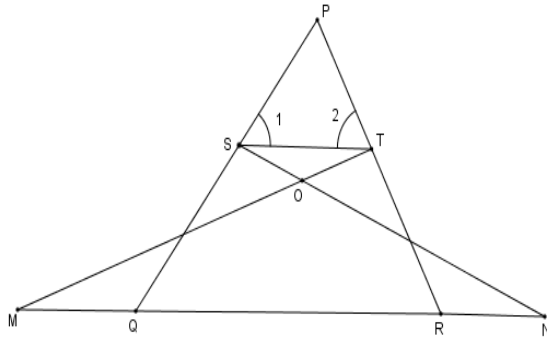
In ΔABC, if AD is the median, then show that $AB^2+AC^2 = 2(AD^2+BD^2)$
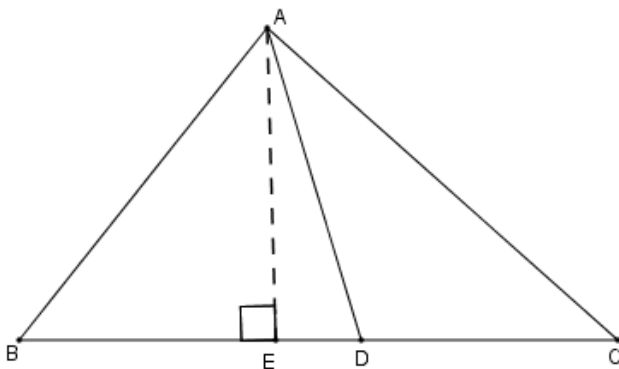
20.	Find the area of the minor segment of a circle of radius 42cm, if length of the corresponding arc is 44cm.	3
21.	Water is flowing at the rate of 15 km per hour through a pipe of diameter 14cm into a rectangular tank which is 50 m long and 44 m wide. Find the time in which the level of water in the tank will rise by 21 cm.	3

<div align="center">**OR**</div>

A solid sphere of radius 3 cm is melted and then recast into small spherical balls each of diameter 0.6cm. Find the number of balls.

22.	The table shows the daily expenditure on grocery of 25 households in a locality. Find the modal daily expenditure on grocery by a suitable method.	3

Daily Expenditure (in Rs.)	100-150	150-200	200-250	250-300	300-350
No of households	4	5	12	2	2

	Section-D	
23.	A train takes 2 hours less for a journey of 300km if its speed is increased by 5 km/h from its usual speed. Find the usual speed of the train.	**4**
	OR	
	Solve for x: $\frac{1}{(a+b+x)} = \frac{1}{a} + \frac{1}{b} + \frac{1}{x}$, $[\mathbf{a} \neq \mathbf{0}, \mathbf{b} \neq \mathbf{0}, \mathbf{x} \neq \mathbf{0}, \mathbf{x} \neq -(\mathbf{a} + \mathbf{b})]$	
24.	An AP consists of 50 terms of which 3rd term is 12 and the last term is 106. Find the 29th term.	**4**
25.	Prove that in a right angled triangle square of the hypotenuse is equal to sum of the squares of other two sides.	**4**
26.	Draw a ΔABC with sides 6cm, 8cm and 9 cm and then construct a triangle similar to ΔABC whose sides are $\frac{3}{5}$ of the corresponding sides of ΔABC.	**4**
27.	A man on the top of a vertical observation tower observes a car moving at a uniform speed coming directly towards it. If it takes 12 minutes for the angle of depression to change from 30^0 to 45^0, how long will the car take to reach the observation tower from this point?	**4**
	OR	
	The angle of elevation of a cloud from a point 60 m above the surface of the water of a lake is 30^0 and the angle of depression of its shadow from the same point in water of lake is 60^0. Find the height of the cloud from the surface of water.	
28.	The median of the following data is 525. Find the values of x and y if the total frequency is 100.	**4**

Class Interval	Frequency
0-100	2
100-200	5
200-300	x
300-400	12
400-500	17
500-600	20
600-700	Y
700-800	9
800-900	7
900-1000	4

The following data indicates the marks of 53 students in Mathematics.

Marks	Number of students
0-10	5
10-20	3
20-30	4
30-40	3
40-50	4
50-60	4
60-70	7
70-80	9
80-90	7
90-100	8

Draw less than type ogive for the data above and hence find the median.

29.	The radii of circular ends of a bucket of height 24 cm are 15 cm and 5 cm. Find the area of its curved surface.	4
30.	If $sec\theta + tan\theta = p$, then find the value of $cosec\theta$.	4