

**Class X**  
**Mathematics**  
**Sample Question Paper 2018-19**

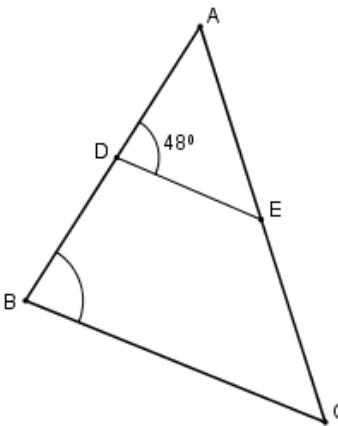
**Time allowed: 3 Hours**

**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**

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

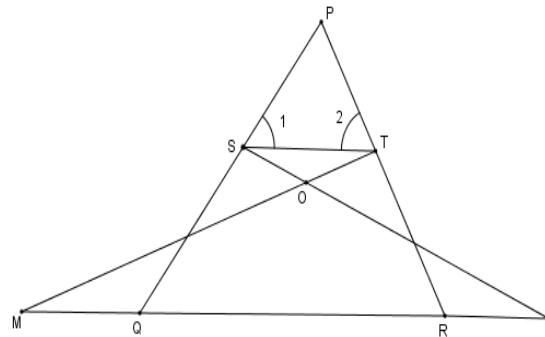
### Section-B

7.	The HCF and LCM of two numbers are 9 and 360 respectively. If one number is 45, find the other number.	2
<b>OR</b>		
Show that $7 - \sqrt{5}$ is irrational, give that $\sqrt{5}$ is irrational.		
8.	Find the 20 <sup>th</sup> term from the last term of the AP 3,8,13,....,253	2
<b>OR</b>		
If 7 times the 7 <sup>th</sup> term of an A.P is equal to 11 times its 11 <sup>th</sup> term, then find its 18 <sup>th</sup> 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 $(p-3)x+3y = p$ $px+py = 12$	2

### Section-C

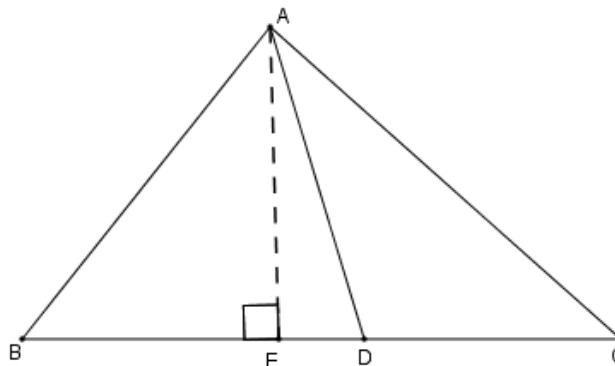
13.	Use Euclid's Division Algorithm to find the HCF of 726 and 275.	3
14.	Find the zeroes of the following polynomial: $5\sqrt{5}x^2+30x+8\sqrt{5}$	3
15.	Places A and B are 80 km apart from each other on a highway. A car starts from A and another from B at the same time. If they move in same direction 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
<b>OR</b>		
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 $\cot\theta - \tan\theta = \frac{2\cos^2\theta - 1}{\sin\theta\cos\theta}$	3
<b>OR</b>		
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  $\angle 1 = \angle 2$  and  $\Delta NSQ \cong \Delta MTR$ , then prove that  $\Delta PTS \sim \Delta PRQ$ . 3



**OR**

In  $\Delta ABC$ , 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

**OR**

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

<p><b>23.</b> 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. <span style="float: right;">4</span></p> <p style="text-align: center;"><b>OR</b></p> <p>Solve for <math>x</math>: <math>\frac{1}{(a+b+x)} = \frac{1}{a} + \frac{1}{b} + \frac{1}{x}</math> , [ <math>a \neq 0, b \neq 0, x \neq 0, x \neq -(a + b)</math> ]</p>																						
<p><b>24.</b> An AP consists of 50 terms of which 3<sup>rd</sup> term is 12 and the last term is 106. Find the 29<sup>th</sup> term. <span style="float: right;">4</span></p>																						
<p><b>25.</b> Prove that in a right angled triangle square of the hypotenuse is equal to sum of the squares of other two sides. <span style="float: right;">4</span></p>																						
<p><b>26.</b> Draw a <math>\Delta ABC</math> with sides 6cm, 8cm and 9 cm and then construct a triangle similar to <math>\Delta ABC</math> whose sides are <math>\frac{3}{5}</math> of the corresponding sides of <math>\Delta ABC</math>. <span style="float: right;">4</span></p>																						
<p><b>27.</b> 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 <math>30^\circ</math> to <math>45^\circ</math>, how long will the car take to reach the observation tower from this point? <span style="float: right;">4</span></p> <p style="text-align: center;"><b>OR</b></p> <p>The angle of elevation of a cloud from a point 60 m above the surface of the water of a lake is <math>30^\circ</math> and the angle of depression of its shadow from the same point in water of lake is <math>60^\circ</math>. Find the height of the cloud from the surface of water.</p>																						
<p><b>28.</b> The median of the following data is 525. Find the values of <math>x</math> and <math>y</math> if the total frequency is 100. <span style="float: right;">4</span></p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="width: 45%;">Class Interval</th> <th style="width: 55%;">Frequency</th> </tr> </thead> <tbody> <tr> <td>0-100</td> <td>2</td> </tr> <tr> <td>100-200</td> <td>5</td> </tr> <tr> <td>200-300</td> <td><math>x</math></td> </tr> <tr> <td>300-400</td> <td>12</td> </tr> <tr> <td>400-500</td> <td>17</td> </tr> <tr> <td>500-600</td> <td>20</td> </tr> <tr> <td>600-700</td> <td><math>Y</math></td> </tr> <tr> <td>700-800</td> <td>9</td> </tr> <tr> <td>800-900</td> <td>7</td> </tr> <tr> <td>900-1000</td> <td>4</td> </tr> </tbody> </table>	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
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OR

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.

<b>29.</b>	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.	<b>4</b>
<b>30.</b>	If $\sec\theta + \tan\theta = p$ , then find the value of $\cosec\theta$ .	<b>4</b>