



**GW PARIKSHA-01**

**CLASS-X**

**SUB.-MATHEMATICS**

**TIME ALLOWED: 3 HRS**

**MAX. MARKS : 80**

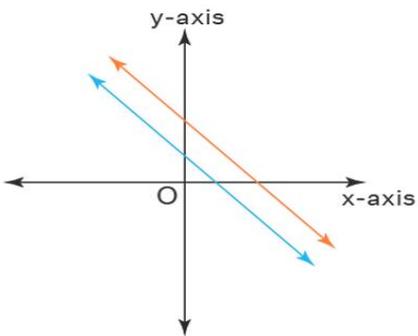
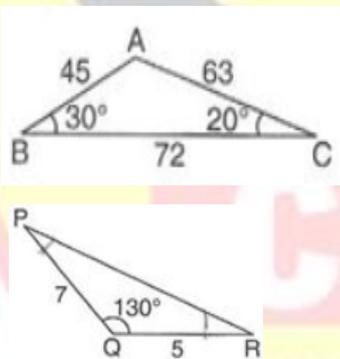
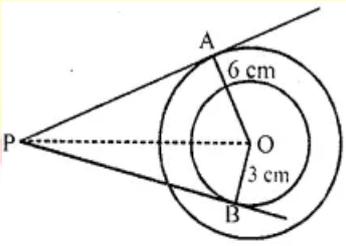
**General Instructions:**

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. 19 and 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 marks each.
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. An internal choice has been provided in all the 2 marks questions of Section E.
9. Draw neat and clean figures wherever required.
10. Take  $\pi = 22/7$  wherever required if not stated.
11. Use of calculators is not allowed.

**SECTION A**

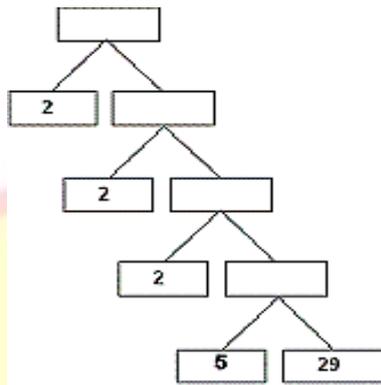
1	If the HCF of 72 and 234 is 18, then the LCM (72, 234) is: a) 936                                      b) 836                                      c) 324                                      d) 234	[1]
2	Graph of a polynomial $p(x)$ is given in the figure. The number of zeroes of $p(x)$ is: 	[1]

	a) 2	b) 5	c) 3	d) 4	
3	A system of linear equations is said to be inconsistent if it has				[1]
					
	a) one solution	b) at least one solution	c) two solutions	d) no solution	
4	If one root of $5x^2 + 13x + k = 0$ be the reciprocal of the other root then the value of k is				[1]
	a) 2	b) 5	c) 1	d) 0	
5	The sum of the first 100 even natural numbers is:				[1]
	a) 2550	b) 10100	c) 5050	d) 10010	
6	The point on the x - axis which is equidistant from points $(-1, 0)$ and $(5, 0)$ is				[1]
	a) $(0, 3)$	b) $(3, 0)$	c) $(2, 0)$	d) $(0, 2)$	
7	The centroid of a triangle whose vertices are $(3, -7)$ , $(-8, 6)$ and $(5, 10)$ is				[1]
	a) $(3, 3)$	b) $(0, 3)$	c) $(0, 9)$	d) $(1, 3)$	
8	In the figures find the measures of $\angle P$ and $\angle R$				[1]
					
	a) $20^\circ, 30^\circ$	b) $50^\circ, 40^\circ$	c) $40^\circ, 50^\circ$	d) $30^\circ, 20^\circ$	
9	In Figure, if $AP = 10$ cm, then $BP =$				[1]
					
	a) $\sqrt{109}$ cm	b) $\sqrt{91}$ cm	c) $\sqrt{127}$ cm	d) $\sqrt{119}$ cm	
10	A circle is inscribed in a quadrilateral ABCD in which $\angle B = 90^\circ$ , if $AD = 23$ cm, $AB = 29$ cm and $DS = 5$ cm, then radius of circle is :				[1]

	a) 13 cm	b) 12 cm	c) 11 cm	d) 14 cm	
11	If $a \cos \theta + b \sin \theta = m$ and $a \sin \theta - b \cos \theta = n$ , then $a^2 + b^2 =$				[1]
	a) $m^2 n^2$	b) $n^2 - m^2$	c) $m^2 + n^2$	d) $m^2 - n^2$	
12	If $2\cos 3\theta = 1$ then $\theta = ?$				[1]
	a) $15^\circ$	b) $10^\circ$	c) $30^\circ$	d) $20^\circ$	
13	A vertical stick 20 cm long casts a shadow 15 cm long. At the same time, a tower casts a shadow 30 m long. The height of the tower is				[1]
	a) 15 m	b) 20 m	c) 30 m	d) 40 m	
14	The area of a quadrant of a circle whose circumference is 616 cm will be				[1]
	a) $7564 \text{ cm}^2$	b) $7546 \text{ cm}^2$	c) $7456 \text{ cm}^2$	d) $7500 \text{ cm}^2$	
15	If the area of a sector of a circle is $\frac{7}{20}$ of the area of the circle, then the angle at the centre is equal to				[1]
	a) $126^\circ$	b) $110^\circ$	c) $130^\circ$	d) $100^\circ$	
16	The probability of getting a sum of 13 in a single throw of two dice is				[1]
	a) $\frac{5}{6}$	b) 0	c) $\frac{1}{6}$	d) 1	
17	Harshit goes to school by a car driven by his driver or uses his bicycle. Probability that he will use the car is $\frac{3}{7}$ . What is the probability that he will use his bicycle for going to the school?				[1]
	a) $\frac{4}{7}$	b) $\frac{6}{7}$	c) $\frac{1}{7}$	d) $\frac{5}{7}$	
18	If the mean of data is 27 and its median is 33 then the mode is				[1]
	a) 45	b) 30	c) 43	d) 47	
19	<p><b>Assertion (A):</b> Two identical solid cubes of side 5 cm are joined end to end. The total surface area of the resulting cuboid is <math>300 \text{ cm}^2</math>.</p> <p><b>Reason (R):</b> Total surface area of a cuboid is <math>2(lb + bh + lh)</math></p>				[1]
	<p>a) Both A and R are true and R is the correct explanation of A.</p> <p>b) Both A and R are true but R is not the correct explanation of A.</p> <p>c) A is true but R is false.</p> <p>d) A is false but R is true.</p>				
20	<p><b>Assertion (A):</b> If <math>n^{\text{th}}</math> term of an A.P. is <math>7 - 4n</math>, then its common difference is - 4.</p> <p><b>Reason (R):</b> Common difference of an A.P. is given by <math>d = a_{n-1} - a_n</math></p>				[1]
	<p>a) A is true but R is false.</p> <p>b) Both A and R are true but R is not the correct explanation of A.</p> <p>c) Both A and R are true and R is the correct explanation of A.</p> <p>d) A is false but R is true.</p>				

**SECTION B**

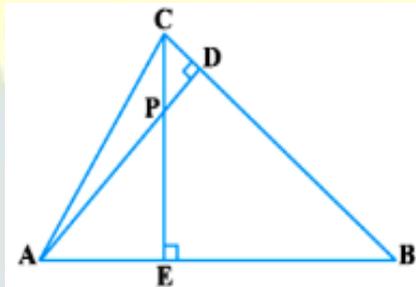
21 Find the missing numbers in the following factorization:



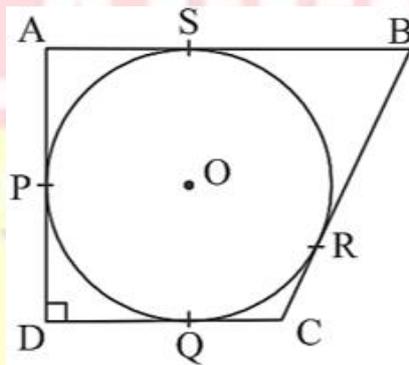
**OR**

Prove that  $5 + 2\sqrt{3}$  is an irrational number, given that  $\sqrt{3}$  is an irrational number.

22 In the figure, altitudes AD and CE of  $\triangle ABC$  intersect each other at the point P. Show that:  $\triangle AEP \sim \triangle CDP$



23 A circle with centre O and radius 8 cm is inscribed in a quadrilateral ABCD in which P, Q, R, S are the points of contact as shown. If AD is perpendicular to DC,  $BC = 30$  cm and  $BS = 24$  cm, then find the length DC.



24 Find A and B if  $\sin(A + 2B) = \frac{\sqrt{3}}{2}$  and  $\cos(A + 4B) = 0$ , where A and B are acute angles.

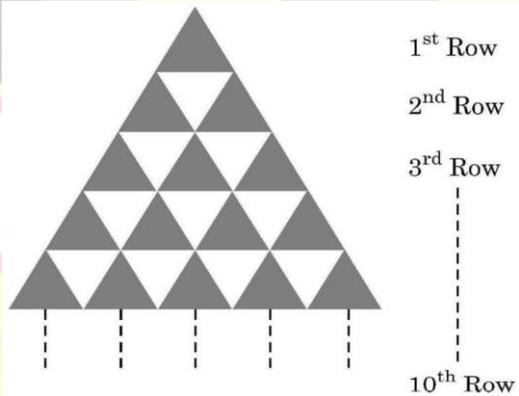
**OR**

Verify that,  $\cos 60^\circ = \cos^2 30^\circ - \sin^2 30^\circ = \frac{1}{2}$ .

25 A horse is tied with a 14 m long rope at one corner of an equilateral triangular field having side 20 m. Find the area of the field where the horse cannot graze.

**SECTION C**

26	In the Hospital The nurse is supposed to monitor a patient after 84 min another at 90 min and the third one at 120 min. For this, she set up alarms accordingly. At what time will all her alarms ring at the same time?	[3]																				
27	Find the zeroes of the polynomial $p(x) = 2x^2 + 5x + 2$ and verify the relationship between zeroes of $p(x)$ and its coefficients.	[3]																				
28	Find the mean of the following frequency distribution:  <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <thead> <tr> <th style="padding: 5px;">Class interval</th> <th style="padding: 5px;">0-6</th> <th style="padding: 5px;">6-12</th> <th style="padding: 5px;">12-18</th> <th style="padding: 5px;">18-24</th> <th style="padding: 5px;">24-30</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;"><b>Frequency</b></td> <td style="padding: 5px;">6</td> <td style="padding: 5px;">8</td> <td style="padding: 5px;">10</td> <td style="padding: 5px;">9</td> <td style="padding: 5px;">7</td> </tr> </tbody> </table>	Class interval	0-6	6-12	12-18	18-24	24-30	<b>Frequency</b>	6	8	10	9	7	[3]								
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<b>Frequency</b>	6	8	10	9	7																	
29	A train covered a certain distance at a uniform speed. If the train had been 5 kmph faster, it would have taken 3 hours less than the scheduled time. And, if the train were slower by 4 kmph, it would have taken 3 hours more than the scheduled time. Find the length of the journey.  <p style="text-align: center;"><b>OR</b></p> Solve: $37x + 41y = 70$ $41x + 37y = 86$	[3]																				
30	Prove that: $\sqrt{\frac{\operatorname{cosec}\theta - 1}{\operatorname{cosec}\theta + 1}} + \sqrt{\frac{\operatorname{cosec}\theta + 1}{\operatorname{cosec}\theta - 1}} = 2\sec\theta$	[3]																				
31	Two tangents TP and TQ are drawn to a circle with centre O from an external point T. Prove that $\angle PTQ = 2\angle OPQ$ .  <p style="text-align: center;"><b>OR</b></p> From an external point P, tangents PA and PB are drawn to a circle with centre O. At one point E on the circle tangent is drawn which intersects PA and PB at C and D respectively. If PA = 14 cm, find the perimeter of $\triangle PCD$ .	[3]																				
<b>SECTION D</b>																						
32	A life insurance agent found the following data for the distribution of 100 policy holders on the basis of their ages. Find the median age of the policy holders.  <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <thead> <tr> <th style="padding: 5px;">Age (in years)</th> <th style="padding: 5px;">Number of policy holders</th> </tr> </thead> <tbody> <tr><td style="padding: 5px;">15-20</td><td style="padding: 5px;">2</td></tr> <tr><td style="padding: 5px;">20-25</td><td style="padding: 5px;">4</td></tr> <tr><td style="padding: 5px;">25-30</td><td style="padding: 5px;">18</td></tr> <tr><td style="padding: 5px;">30-35</td><td style="padding: 5px;">21</td></tr> <tr><td style="padding: 5px;">35-40</td><td style="padding: 5px;">33</td></tr> <tr><td style="padding: 5px;">40-45</td><td style="padding: 5px;">11</td></tr> <tr><td style="padding: 5px;">45-50</td><td style="padding: 5px;">3</td></tr> <tr><td style="padding: 5px;">50-55</td><td style="padding: 5px;">6</td></tr> <tr><td style="padding: 5px;">55-60</td><td style="padding: 5px;">2</td></tr> </tbody> </table>	Age (in years)	Number of policy holders	15-20	2	20-25	4	25-30	18	30-35	21	35-40	33	40-45	11	45-50	3	50-55	6	55-60	2	[5]
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33	Sides AB and AC and median AD of a triangle ABC are respectively proportional to sides PQ and PR and median PM of another triangle PQR. Show that $\Delta ABC \sim \Delta PQR$ .	[5]
34	<p>A train takes 2 hours less for a journey of 300 km if its speed is increased by 5 km/hr from its usual speed. Find the usual speed of the train.</p> <p style="text-align: center;"><b>OR</b></p> <p>A cottage industry produces a certain number of pottery articles in a day. It was observed on a particular day that cost of production of each article (in rupees) was 3 more than twice the number of articles produced on that day. If, the total cost of production on that day was ₹ 90, find the number of articles produced and the cost of each article.</p>	[5]
35	<p>A spherical glass vessel has a cylindrical neck which is 7 cm long and 2 cm in diameter. The diameter of the spherical part is 14 cm. Find the capacity of the entire glass vessel. (Use <math>\pi = \frac{22}{7}</math>)</p> <p style="text-align: center;"><b>OR</b></p> <p>A solid wooden toy is in the shape of a right circular cone mounted on a hemisphere. If the radius of the hemisphere is 4.2 cm and the total height of the toy is 10.2 cm, find the volume of that wooden toy.</p>	[5]
<b>SECTION E</b>		
36	<p>In an equilateral triangle of side 10 cm, equilateral triangles of side 1 cm are formed as shown in the figure below, such that there is one triangle in the first row, three triangles in the second row, five triangles in the third row and so on.</p> <div style="text-align: center;">  </div> <p>Based on given information, answer the following questions using Arithmetic Progression.</p> <ol style="list-style-type: none"> <li>1. How many triangles will be there in bottom most row? <span style="float: right;">(1)</span></li> <li>2. How many triangles will be there in fourth row from the bottom? <span style="float: right;">(1)</span></li> <li>3.       <ol style="list-style-type: none"> <li>a. Find the total number of triangles of side 1 cm each till 8<sup>th</sup> row. <span style="float: right;">(2)</span></li> </ol> </li> </ol> <p style="text-align: center;"><b>OR</b></p> <p>b. How many more number of triangles are there from 5<sup>th</sup> row to 10<sup>th</sup> row than in first 4 rows? Show working. <span style="float: right;">(2)</span></p>	[4]

37 Read the following text carefully and answer the questions that follow:

[4]

The Chief Minister of Delhi launched the, 'Switch Delhi', an electric vehicle mass awareness campaign in the National Capital. The government has also issued tenders for setting up 100 charging stations across the city. Each station will have five charging points. For demo charging station is set up along a straight line and has charging points at  $A\left(\frac{-7}{3}, 0\right)$ ,  $B\left(0, \frac{7}{4}\right)$ ,  $C(3, 4)$ ,  $D(7, 7)$  and  $E(x, y)$ . Also, the distance between C and E is 10 units.



1. What is the distance DE? (1)
2. What is the value of  $x + y$ ? (1)
3. Points C, D, E are collinear or not? (2)

OR

What is the ratio in which B divides AC? (2)

38 The following TV Tower was built in 1988 and is located in Pitampura, Delhi. It has an observation deck. Observe the picture given below:

[4]



The TV Tower stands vertically on the ground. From a point A on the ground, the angle of elevation of top of the tower (point B) is  $60^\circ$ . There is a point C on the tower which is 78 m (approx.) above the ground. The angle of elevation of the point C from point A is found to be  $30^\circ$ . Based on the above information, answer the following questions:

1. Draw a well - labelled figure, based on the information given above. (2)
2. Find the height of the tower and the distance of the tower from point A. (2)