

**KENDRIYA VIDYALAYA SANGATHAN JAMMU REGION**

**(PRE BOARD 1) 2025-26 SET 2**

**Class: X**

**Subject : Basic Math (241)**

**Max. Marks: 80**

**Time Allowed: 3Hrs**

**General Instructions:**

This Question Paper has 5 Sections A-E.

Section A has 20 MCQ's carrying 1 mark each

Section B has 5 questions carrying 02 marks each.

Section C has 6 questions carrying 03 marks each.

Section D has 4 questions carrying 05 marks each.

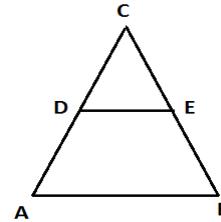
Section E has 3 case based integrated units of assessment (04 marks each) with sub- parts of the values of 1, 1 and 2 marks each respectively.

All Questions are compulsory. However, an internal choice in 2 Questions of 5 marks, 2

Questions of 3 marks and 1 Question of 2 marks has been provided.

Draw neat figures wherever required.

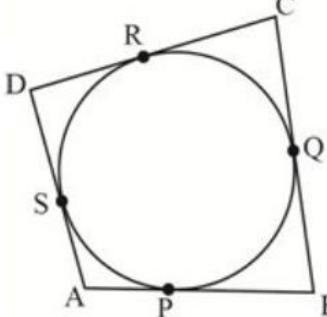
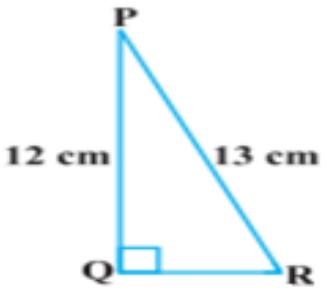
**SECTION A( 1 MARKS EACH)**

Q1.	<p>In ABC, <math>DE \parallel AB</math>. If <math>CD = 3 \text{ cm}</math>, <math>EC = 4 \text{ cm}</math>, <math>BE = 6 \text{ cm}</math>, then <math>DA</math> is equal to</p> <p>(a) 7.5 cm (b) 3 cm (c) 4.5 cm (d) 6 cm</p>		1
Q2.	<p><math>\sin 2B = 2 \sin B</math> is true when B is equal to</p> <p>(a) <math>90^\circ</math> (b) <math>60^\circ</math> (c) <math>30^\circ</math> (d) <math>0^\circ</math></p>	1	
Q3.	<p>If two dice are thrown in the air, the probability of getting sum as 3 will be</p> <p>(a) <math>2/18</math> (b) <math>3/18</math> (c) <math>1/18</math> (d) <math>1/36</math></p>	1	
Q4.	<p>A quadratic polynomial, whose zeroes are <math>-4</math> and <math>-5</math>, is</p> <p>(a) <math>x^2 - 9x + 20</math> (b) <math>x^2 + 9x + 20</math> (c) <math>x^2 - 9x - 20</math> (d) <math>x^2 + 9x - 20</math></p>	1	
Q5.	<p>The quadratic equation <math>4x^2 + 4x + 1 = 0</math> has:</p> <p>(a) no real roots (b) two real and equal roots (c) two real and distinct roots (d) one real and one complex root</p>	1	

Q6.	<p>If <math>\frac{AB}{DF} = \frac{BC}{FE} = \frac{CA}{ED}</math>, then</p> <p>(a) <math>\Delta ABC \sim \Delta DEF</math>          (b) <math>\Delta ABC \sim \Delta EDF</math>          (c) <math>\Delta ABC \sim \Delta EFD</math>          (d) <math>\Delta ABC \sim \Delta DFE</math></p>	1
Q7.	<p>Graphically, the pair of equations <math>7x - y = 5</math>; <math>21x - 3y = 10</math> represents two lines which are</p> <p>(a) intersecting at one point          (b) parallel          (c) intersecting at two points          (d) coincident</p>	1
Q8.	<p>What is the minimum value of <math>\sin A</math>, <math>0 \leq A \leq 90^\circ</math></p> <p>(a) -1          (b) 0          (c) 1          (d) 12</p>	1
Q9.	<p>If <math>P(E) = 0.07</math>, then what is the probability of 'not E'?</p> <p>(a) 0.93          (b) 0.95          (c) 0.89          (d) 0.90</p>	1
Q10.	<p>The class interval of a given observation is 10 to 15, then the class mark for this interval will be:</p> <p>(a) 11.5          (b) 12.5          (c) 12          (d) 14</p>	1
Q11.	<p>The tangent to a circle is _____ to the radius through the point of contact.</p> <p>(a) parallel          (b) perpendicular          (c) perpendicular bisector          (d) bisector</p>	1
Q12.	<p>If two positive integers A and B can be expressed as <math>A = xy^3</math> and <math>B = xy^2z</math>; <math>x, y</math> being prime numbers, the LCM (A, B) is</p> <p>(a) <math>xy^2</math>          (b) <math>x^4y^2z</math>          (c) <math>x^4y^3</math>          (d) <math>xy^3z</math></p>	1



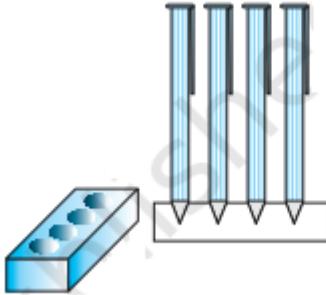
**SECTION B (2 MARKS EACH)**

Q21.	<p>If <math>\alpha</math> and <math>\beta</math> are zeroes of the polynomial <math>2x^2 - 5x + 7</math>, then find the value of <math>\frac{1}{\alpha} + \frac{1}{\beta}</math>.</p>	2
Q22.	<p>Three farmers have 490 kg, 588 kg and 882 kg of wheat respectively. Find the maximum capacity of a bag so that the wheat can be packed in exact number of bags.</p> <p align="center"><b>OR</b></p> <p>The LCM of the two numbers is 360, and their HCF is 24. If one of the numbers is 120, find the other number.</p>	2
Q23.	<p>A quadrilateral ABCD is drawn to circumscribe a circle (see Fig. 10.12). Prove that <math>AB + CD = AD + BC</math></p> 	2
Q24.	<p>Find the values of <math>k</math> for the quadratic equation <math>kx(x - 2) + 6 = 0</math>, so that it have two equal roots.</p>	2
Q25.	<p>If <math>\tan(A + B) = \sqrt{3}</math> and <math>\tan(A - B) = 1/\sqrt{3}</math>, <math>0^\circ &lt; A + B \leq 90^\circ</math>; <math>A &gt; B</math>, find <math>A</math> and <math>B</math>.</p> <p align="center"><b>OR</b></p> <p>Find <math>\tan P - \cot R</math></p> 	2

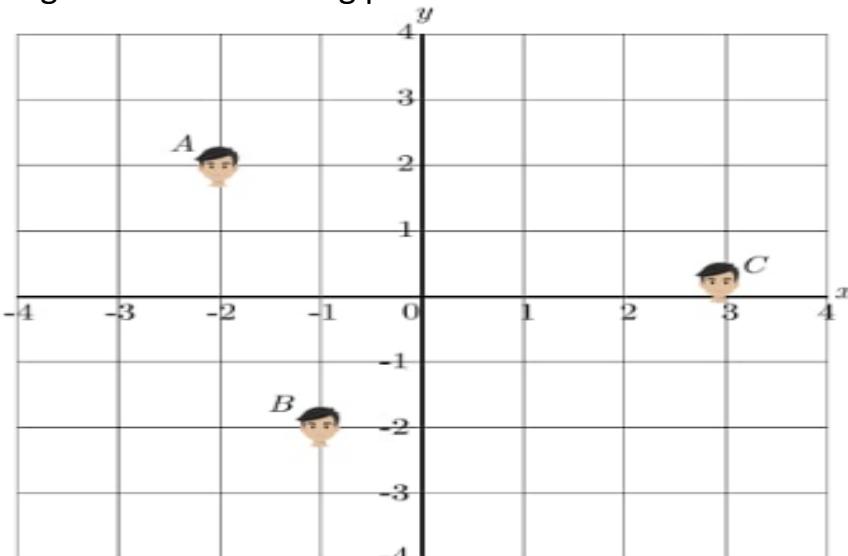
**SECTION C (3 MARKS EACH)**

Q26.	<p>If the 3<sup>rd</sup> and the 9<sup>th</sup> terms of an A.P. are 4 and -8 respectively. Which term of this A.P. is zero?</p>	3
Q27.	<p>Prove that <math>\sqrt{3}</math> is irrational.</p>	3
Q28.	<p>Prove that the length of the tangents drawn from an external point to a circle are equal.</p>	3
Q29.	<p>Prove <math>(\sin A + \operatorname{cosec} A)^2 + (\cos A + \sec A)^2 = 7 + \tan^2 A + \cot^2 A</math></p>	3

Q30.	<p>Solve <math>2x + 3y = 11</math> and <math>2x - 4y = - 24</math> and hence find the value of 'm' for which <math>y = mx - 3</math>.</p> <p style="text-align: center;"><b>OR</b></p> <p>For which value of k will the following pair of linear equations have no solution?</p> $3x + y = 1$ $(2k - 1)x + (k - 1)y = 2k + 1$	3																																				
Q31.	<p>The median of the following data is 525. Find the values of x and y, if the total frequency is 100.</p> <table border="1" data-bbox="225 508 997 1100"> <thead> <tr> <th data-bbox="225 508 507 561">Class interval</th><th data-bbox="507 508 997 561">Class interval frequency</th></tr> </thead> <tbody> <tr> <td data-bbox="225 561 507 614">0-100</td><td data-bbox="507 561 997 614">2</td></tr> <tr> <td data-bbox="225 614 507 667">100-200</td><td data-bbox="507 614 997 667">5</td></tr> <tr> <td data-bbox="225 667 507 720">200-300</td><td data-bbox="507 667 997 720">x</td></tr> <tr> <td data-bbox="225 720 507 772">300-400</td><td data-bbox="507 720 997 772">12</td></tr> <tr> <td data-bbox="225 772 507 825">400-500</td><td data-bbox="507 772 997 825">17</td></tr> <tr> <td data-bbox="225 825 507 878">500-600</td><td data-bbox="507 825 997 878">20</td></tr> <tr> <td data-bbox="225 878 507 931">600-700</td><td data-bbox="507 878 997 931">y</td></tr> <tr> <td data-bbox="225 931 507 984">700-800</td><td data-bbox="507 931 997 984">9</td></tr> <tr> <td data-bbox="225 984 507 1036">800-900</td><td data-bbox="507 984 997 1036">7</td></tr> <tr> <td data-bbox="225 1036 507 1089">900-1000</td><td data-bbox="507 1036 997 1089">4</td></tr> </tbody> </table> <p style="text-align: center;"><b>OR</b></p> <p>100 surnames were randomly picked up from a local telephone directory and the frequency distribution of the number of letters in the English alphabets in the surnames was obtained as follows: Determine the median number of letters in the surnames. Also, find the modal size of the surnames.</p> <table border="1" data-bbox="225 1343 1372 1543"> <thead> <tr> <th data-bbox="225 1343 621 1396">Number of letters</th><th data-bbox="621 1343 727 1396">1-4</th><th data-bbox="727 1343 833 1396">4-7</th><th data-bbox="833 1343 940 1396">7-10</th><th data-bbox="940 1343 1046 1396">10-13</th><th data-bbox="1046 1343 1152 1396">13-16</th><th data-bbox="1152 1343 1372 1396">16-19</th></tr> </thead> <tbody> <tr> <td data-bbox="225 1396 621 1543">Number of surnames</td><td data-bbox="621 1396 727 1543">6</td><td data-bbox="727 1396 833 1543">30</td><td data-bbox="833 1396 940 1543">40</td><td data-bbox="940 1396 1046 1543">16</td><td data-bbox="1046 1396 1152 1543">4</td><td data-bbox="1152 1396 1372 1543">4</td></tr> </tbody> </table>	Class interval	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	Number of letters	1-4	4-7	7-10	10-13	13-16	16-19	Number of surnames	6	30	40	16	4	4	3
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SECTION D	<p>Q32. State and prove Basic Proportionality theorem.</p> <p>Q33. A train travels 360 km at a uniform speed. If the speed had been 5 km/h more, it would have taken 1 hour less for the same journey. Find the speed of the train.</p> <p style="text-align: center;"><b>OR</b></p> <p>Find the nature of the roots of the following quadratic equations. If the real roots exist, find them.</p> $2x^2 - 6x + 3 = 0$	5																																				

Q34.	<p>From a point on the ground, the angles of elevation of the bottom and the top of a transmission tower fixed at the top of a 20 m high building are <math>45^\circ</math> and <math>60^\circ</math> respectively. Find the height of the tower.</p> <p><b>OR</b></p> <p>Two poles of equal heights are standing opposite each other on either side of the road, which is 80 m wide. From a point between them on the road, the angles of elevation of the top of the poles are <math>60^\circ</math> and <math>30^\circ</math>, respectively. Find the height of the poles and the distances of the point from the poles.</p>	5
Q35.	<p>A pen stand made of wood is in the shape of a cuboid with four conical depressions to hold pens. The dimensions of the cuboid are 15 cm by 10 cm by 3.5 cm. The radius of each of the depressions is 0.5 cm, and the depth is 1.4 cm. Find the volume of wood in the entire stand (see Fig.).</p> 	5

### SECTION E

Q36.	<p>Ajay, Bhigu and Colin are fast friend since childhood. They always want to sit in a row in the classroom. But teacher doesn't allow them and rotate the seats row-wise every day. Bhigu is very good in maths and he does distance calculation every day. He consider the centre of class as origin and marks their position on a paper in a co-ordinate system. One day Bhigu make the following diagram of their seating position.</p> 	
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	<p>(i) What are the coordinates of point B and C?  (ii) What is the distance between A and B?</p> <p style="text-align: center;"><b>OR</b></p> <p>What is the distance between B and C?  (iii) If D is the mid-point of line segment joining points A and C, find coordinates of point D.</p>	1M 2M 1M
Q37.	<p>Cards on which numbers 1, 2, 3 ..... 100 are written (one number on one card and no number is repeated), put in a bag and are mixed thoroughly. A card is drawn at random from the bag. Find the following probability.</p> <p>(i) What is the probability that card taken out has an odd number?  (ii) What is the probability that card taken out has a two digit odd number?  (iii) What is the probability that card taken out has an odd number which is multiple of 11?</p> <p style="text-align: center;"><b>OR</b></p> <p>What is the probability that card taken out has an odd number which is not less than 70?</p>	1M 1M 2M
Q38.	<p>A horse is tied to a peg at one corner of a square shaped grass field of side 15 m by means of a 5 m long rope. (Use <math>\pi = 3.14</math>)</p>  <p>(i) Find the angle of sector grazed by the horse.  (ii) Find the area of the square field.  (iii) The area of that part of the field in which the horse can graze.</p> <p style="text-align: center;"><b>OR</b></p> <p>the increase in the grazing area if the rope were 10 m long instead of 5 m.</p>	1 1 2