



# ConnectEd Sample Question Paper – 2

## Mathematics (041)



**Class - X, Session: 2021-22**

**TERM II**

**Time Allowed: 2 hours**

**Maximum Marks: 40**

### General Instructions:

1. The question paper consists of 14 questions divided into 3 sections A, B, C.
2. All questions are compulsory.
3. Section A comprises of 6 questions of 2 marks each. Internal choice has been provided in two questions.
4. Section B comprises of 4 questions of 3 marks each. Internal choice has been provided in one question.
5. Section C comprises of 4 questions of 4 marks each. An internal choice has been provided in one question. It contains two case study based questions.

### Section - A

Section - A		
Q. No.		Marks

1	<p>Write all the values of <math>p</math> for which the quadratic equation <math>x^2 + px + 16 = 0</math> has equal roots?</p> <p style="text-align: center;"><b>OR</b></p> <p>What will be the <math>n^{th}</math> term of an A.P. be, if the <math>p^{th}</math> term is 'q' and the <math>q^{th}</math> term is 'p'?</p>	2																
2	What is the common difference of an A.P in which $a_{21} - a_7 = 84$ ?	2																
3	For what value of $k$ will the consecutive terms $2x + 1$ , $3k + 3$ and $5k - 1$ form an A.P?	2																
4	A solid metallic cuboid of dimensions 9m by 8m by 2m is melted and recast into solid cubes of edge 2m. Find the number of cubes so formed.	2																
5	Two cubes have their volumes in the ratio 1:27. Find the ratio of their surface areas.	2																
6	<p>Solve the quadratic equation: <math>\frac{1}{x+1} + \frac{2}{x+2} = \frac{4}{x+4}</math>, <math>x \neq -1, -2, -4</math>.</p> <p style="text-align: center;"><b>OR</b></p> <p>Find the value of 'f' if the mean of the following data is 52</p> <table border="1" data-bbox="277 1261 1294 1357"> <tbody> <tr> <td>Class</td> <td>10-20</td> <td>20-30</td> <td>30-40</td> <td>40-50</td> <td>50-60</td> <td>60-70</td> <td>70-80</td> </tr> <tr> <td>Frequency</td> <td>5</td> <td>3</td> <td>f</td> <td>7</td> <td>2</td> <td>6</td> <td>13</td> </tr> </tbody> </table>	Class	10-20	20-30	30-40	40-50	50-60	60-70	70-80	Frequency	5	3	f	7	2	6	13	2
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Frequency	5	3	f	7	2	6	13											
<b>Section - B</b>																		
7	Solve for $x$ : $\frac{x+3}{x+2} = \frac{3x-7}{2x-3}$ ; $x \neq -2, \frac{3}{2}$	3																
8	Solve for $x$ : $x^2 - 4ax - b^2 + 4a^2 = 0$	3																
9	Construct a pair of tangents to a circle of radius 3cm which are inclined at an angle $60^\circ$ .	3																
10	<p>Find the mode of the following data:</p> <table border="1" data-bbox="272 1827 1289 2103"> <thead> <tr> <th>Class Interval</th> <th>Frequency</th> </tr> </thead> <tbody> <tr> <td>20 - 25</td> <td>10</td> </tr> <tr> <td>25 - 30</td> <td>15</td> </tr> <tr> <td>30 - 35</td> <td>5</td> </tr> <tr> <td>35 - 40</td> <td>10</td> </tr> <tr> <td>40 - 45</td> <td>20</td> </tr> </tbody> </table>	Class Interval	Frequency	20 - 25	10	25 - 30	15	30 - 35	5	35 - 40	10	40 - 45	20	3				
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<b>OR</b>								
<p>An electric pole breaks due to a storm in such a way that its top touches the ground and makes an angle of measurement <math>60^\circ</math> with the ground. At what height from the bottom does the pole break if the original height of the pole is 20m. What is the distance of the point where the top touches the ground? (Take <math>\sqrt{3} = 1.732</math>)</p>								
<b>Section - C</b>								
<b>11</b>	An aeroplane left 40 minutes late due to heavy rains and in order to reach its destination 1600km away in time, it has to increase its speed by 400km/hr from its usual speed. Find the original speed of the plane.	<b>4</b>						
<b>12</b>	<p>Prove that the parallelogram circumscribing a circle is a rhombus.</p> <p style="text-align: center;"><b>OR</b></p> <p>Prove that the intercept of a tangent to a circle between two parallel tangents to the same circle subtend a right angle at the centre of the circle.</p>	<b>4</b>						
<b>13</b>	<p style="text-align: center;"><b>Case study I</b></p> <p>A group of students of class X visited India Gate on an educational trip. The teacher and students had interest in History as well. The teacher narrated that India Gate, official name is Delhi Memorial, originally called All –India War Memorial monumental sandstone arch in New Delhi, dedicated to the troops of British India who died in wars fought between 1914 and 1919. The teacher also said that India gate, which is located at the eastern end of the Rajpath is about 138 feet (42m) in height.</p>							



Based on the above information answer the questions :

1) They want to see the tower at an angle of  $60^\circ$ . So they want to know the distance where they should stand and hence find the distance.

2) If the altitude of the sun is at  $60^\circ$ , then what is the height of the vertical tower that will cast a shadow of length 20m?

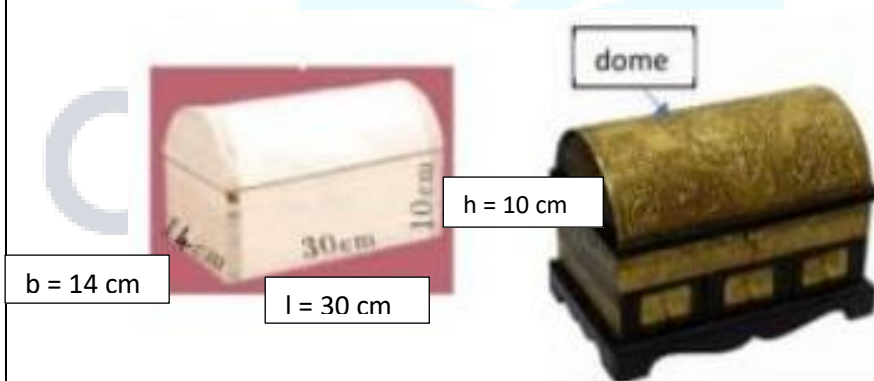
2

2

14

### Case study II

An antique box and its dimensions excluding the stand is given below:



Based on the above given information answer the following questions :

1) Considering the thickness of the box to be negligible, how much velvet cloth will be needed to cover the cuboidal inner area?

2) How many gold coins of diameter 2cm and thickness 0.5cm will fill  $\frac{1}{7}$  of the volume of the dome of jewellery box

2

2



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