



### **CHAPTER-4 [QUADRATIC EQUATIONS]**

<b>Chapter Covered</b>	Quadratic Equations
<b>Learning Objectives</b>	Students will be able to understand how to find the roots of the qua-
	dratic equation using factorization method.
Material Required	Three coloured sheets, scissor, ruler, pencil, glue and cardboard.
Task Assigned Activity	<ul> <li>Choose six students and divide into 3 teams consist of two mem- bers and named them Red Team, Blue Team and Green Team.</li> </ul>
	<ul> <li>Give red, blue and green colour sheets to Red Team, Blue Team and Green Team, respectively.</li> </ul>
	• Now, take a example of quadratic equation i.e., $x^2 + 5x + 6 = 0$ . Now, motivate students to visualize the quadratic equation in form of quadratic polynomial i.e., $x^2 + 5x + 6$ .
	<ul> <li>Now, involve teams to show this quadratic polynomial in form of a rectangle.</li> </ul>
	• For the term $x^2$ in quadratic polynomial Red Team will cut a square of side $x$ (Say $x = 4$ cm) and place it over the cardboard.
	• Now, for the term $5x$ in quadratic polynomial Blue Team will cut 5 rectangles of length $x$ (Say $x = 4$ cm) and breadth 1 cm. Arrange these rectangles as shown in the following figure on cardboard along with the red square.
	• Now, Green Team will cut a rectangle of length 3 cm and breadth 2 cm because we have to break the constant term in such a way that its product is equal to constant term and its sum is equal to middle term <i>i.e.</i> , $6 = 3 \times 2$ and $5 = 3 + 2$ .
	$ \begin{array}{c cccc} x & 3 \times 2 = 6 \\ \hline x & x & x \\ \hline x^2 & x & x \\ \end{array} $
Learning Outcomes	Now, each student of the class can find the area of this rectangle
	i.e., Area = $(x + 3) (x + 2) cm^2$
	• Now, put the polynomial again in form of equation <i>i.e.</i> , $(x + 3)(x + 2) = 0$ .
	• Here, everyone can find the roots of the given quadratic polynomial <i>i.e.</i> , $(x + 3) = 0$ and $(x + 2) = 0$ or $x = -3$ and $x = -2$ .
	• Again, if students multiply the equation $(x + 3) (x + 2) = 0$ , they will get the original equation.
	<ul> <li>In this way, students can easily understand how to find the roots of quadratic equation using factorization.</li> </ul>

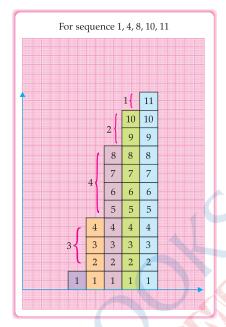
Self Evaluation and Follow Up	<ul> <li>Students can summarize the learning form this activity.</li> <li>They can solve different equation using this activity with enjoyment.</li> <li>They can share their fun learning experience to other friends.</li> </ul>
Ideas	$x^{2} + 3x + 2 = 0$ $x + 2$ $x + 3x + 2 = 0$ $x + 2$ $x + 2$ $x + 2$ $x + 3x + 2 = 0$ $x + 2$ $x + 2$ $x + 3x + 2 = 0$ $x + 2$ $x + 3x + 2 = 0$ $x + 2$ $x + 2$ $x + 3x + 2 = 0$ $x + 3x$
Resource/Links	Quadratic Equation Roots by Factorization





## **CHAPTER-5** [ARITHMETIC PROGRESSIONS]

Chapter Covered	Arithmetic Progression
Learning Objective	Students will be able to understand that the given sequence is an arithmetic progression by paper cutting and pasting method.
Material Required	Coloured papers, a pair of scissors, glue, geometry box, sketch pens, graph papers.
Task Assigned Activity	<ul> <li>Divide the class into two teams i.e. Team A and Team B.</li> <li>Give Team A, a sequence 1, 4, 7, 10, 13.</li> <li>Now, Team A will cut different colour strips of lengths 1 cm, 4 cm, 7 cm, 10 cm, 13 cm and all of the same width 1 cm.</li> <li>Now, take a graph paper and paste these rectangular strips adjacent to each other in order on graph paper as shown in following figure (A).</li> </ul> For sequence 1, 4, 7, 10, 13 <ul> <li>For sequence 1, 4, 7, 10, 13</li> <li>10</li> <li>10</li> <li>9</li> <li>9</li> <li>8</li> <li>8</li> <li>7</li> <li>7</li> <li>7</li> <li>7</li> <li>6</li> <li>6</li> <li>6</li> <li>5</li> <li>5</li> <li>5</li> <li>5</li> </ul> Figure A
	• Give Team B, a sequence 1, 4, 8, 10, 11.
	Now, Team B will cut different colour strips of lengths 1 cm, 4 cm, 8 cm, 10 cm, 11 cm and all of the same width 1 cm (say).
	<ul> <li>Now, take a graph paper and paste these rectangular strips adjacent to each other in order on graph paper as shown in following figure (B).</li> </ul>



#### Figure B

Team A will observe from Figure (A) that the adjoining strips have a common difference in heights *i.e.*, 3 cm and a ladder is formed in which the adjoining steps are constant. Hence it is an arithmetic progression. Thus, sequence 1, 4, 7, 10, 13 is an A.P. because common difference between the term and its predecessor remains constant.

Team B will observe from Figure (B) that the adjoining strips don't have a common difference in heights and thus the adjoining steps of ladder are not constant. Hence it is not an arithmetic progression.

Thus, sequence 1, 4, 8, 10, 11 is not an A.P. because common difference between the term and its predecessor does not remain constant.

#### **Learning Outcomes**

Hence, by this activity students will be able learn the meaning of an arithmetic progression using visualization.

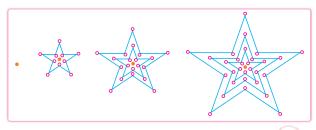
## Self Evaluation and Follow Up

- Students can summarize the learning form this activity.
- They can verify different sequence for A.P. using this fun learning Activity.
- They can share their learning experience with friends and explore new ideas for arithmetic progression.

Ideas

A.P.: 1, 11, 21, 31,...

Here, a = 1 and d = 10



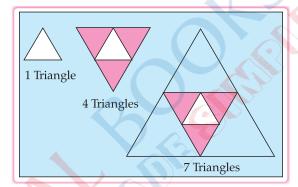
a a+d

a + 2d

a + 3d

A.P.: 1, 4, 7,...

Here, a = 1 and d = 3



### Resource/Links







Math Project-I



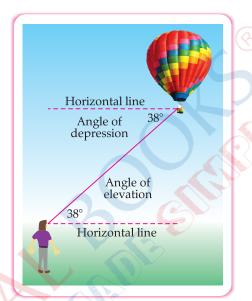


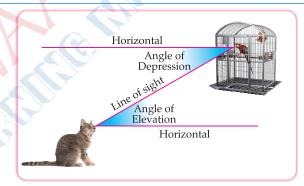
### **CHAPTER-10 [HEIGHTS AND DISTANCES]**

Chapter Covered	Height and Distances
Learning Objectives	<ul> <li>Students will be able to</li> <li>Understand concept of angle of elevation.</li> <li>Understand concept of angle of depression.</li> <li>Visualize the angle of elevation and angle of depression in real life situations.</li> <li>Establish the relation between angle of elevation and angle of depression.</li> </ul>
Material Required	Chart paper, colours, pencil, ruler, glue, pair of scissors, sketch pens and few decorative tapes.
Task Assigned Activity	<ul> <li>Divide the students into groups consist of four members.</li> <li>Each group will make a collage either on angle of elevation or angle of depression on various real life situations where they car visualize these angles.</li> <li>Students can think and discuss with their group members for such type of situation.</li> <li>Students will draw the different picture for angle of elevation or angle of depression for real life situations and paste these pictures on chart paper in form of a collage. Finally students will decorate their collages with different tapes.</li> <li>After completing each group has to give a presentation.</li> <li>Each student has to speak atleast one minute.</li> </ul>
	• To motivate the students award the three best groups.  Horizontal line θ Angle of depression  C Angle of depression  A
	Angle of depression  Ground A  B
	300 - 355 - F

### **Learning Outcomes**

- Students will easily understand the concepts on angle of elevation, angle of depression and line of sight.
- They will enhance their creativity.
- They will start valuing every participant's opinion and idea.
- They can conclude the result the angle of elevation is same as angle of depression.





# Self Evaluation and Follow Up

- Students will collect few picture from magazines in which various situations of angle of elevation and angle of depression can be made.
- They can able to make diagram easily for numerical problems.
- They can share their views and experiences with their teachers and friends.
- They can explore nature for various situations for angle of elevation and angle of depression.

### Ideas

Students can also make 3d models for this activity.





### Resource/Links

Model for Angle of Elevation and depression





Model for Breaking Tree