

CLASS – IX
LESSON PLAN
CHAPTER-12: HERON’S FORMULA

Unit	Chapter 12: Heron’s Formula
Class Transaction	Total: 7 periods (approx. 40 min each)
Pre-requisite for the course	This lesson requires 1. Basic knowledge of triangles and quadrilaterals 2. Knowledge of types of triangles. 3. Knowledge of calculating areas of some basic triangles.
Assessment of qualifying knowledge	1. Written test 2. Lab activity 3. Group Discussion 4. HW notebook
Objective	Students would be able to learn to find the area of triangle when the sides of the triangle are given, to find the area of quadrilateral by dividing them into two triangles by using critical thinking and creative approach of analyzing the given shapes.
Learning Outcomes	<u>KNOWLEDGE</u>- <i>Students will know and understand</i> 1. The formula for calculating area of an equilateral triangle, right angled triangle. 2. How to use Heron’s formula for calculation the area of a triangle whose all the three sides are given. 3. How to calculate the area of a quadrilateral by dividing it into two triangles. <u>SKILLS</u>- <i>Students would be able to</i> 1. Find the area of the given triangles easily by using the learnt formulas. 2. Use Heron’s formula efficiently and thus would be able to find the area of a triangle whose three sides would be given. 3. Apply Heron’s formula in solving day to day real life problems by critical thinking and will be able to analyse the division of shapes into triangular portions.
Transaction Methodology (The teacher can use the mentioned techniques, wherever applicable, and can use any other too.)	Strategies Used : Inductive Deductive Reasoning, Graphic Organizers, Think, pair and share, muddiest point discussion Dimensions of Learning : D1, D2, D3 Transaction would proceed in the following manner- Brain Storming-The class would start with a discussion on what the students have already learnt in the previous classes and hence what is it that

	they would learn now. They would also be told the significance of the topic that they would be studying. <i>Introduction of the topic-</i> ppt and Digital Content would be shared <i>Guided practice followed by Independent Practice-</i> NCERT questions to be discussed in the classroom. Techniques to be used: Quiz Daily Practice Problem MCQ Peer Assessment Case Studies Lab Activities Any Other
Resources	Text Book: NCERT text book for Mathematics Reference Book 1. CBSE Exemplar
Self Study, Home Work, Assignments	Independent Practice: Students would do the questions in their H.W notebooks. HW notebooks to be marked as per the given plan: <i>Assessment Parameters:</i> The total marks for the activity is 5 marks On time submission.....1 mark Presentation/ Neatness.....1 mark Content.....3 marks It is also advised that the students come to the class with proper background knowledge of the topic under discussion. They can refer to the resources stated above.
Assessments	Through Pen Paper Test Students will be assessed creatively and critically 4 UNIT TESTS 20 Marks each HALF YEARLY EXAMINATION 80 Marks ANNUAL BOARD EXAMINATION 80 Marks INTERNAL ASSESSMENT 10 Marks - Note Book Submission 05 Marks - Lab Practical (Subject Enrichment) 05 Marks Through lab Practical Students are assessed for Collaboration, Character building
Addressing	Due to various social backgrounds and multiple intelligences, the

Classroom Diversity	classroom might be a diverse arena. The following techniques can be used for various groups: <i>For gifted students:</i> • Spiral Level 3 questions to be done • Encouragement for referring other resources <i>For weak students:</i> • Spiral Level 1 to be completed • Buddy help to be provided • Provide grade-up classes <i>For differently abled students:</i> • Ignore spelling mistakes and formulae, if not written. • Call parents at regular intervals. • Provide grade-up classes. • Encourage and motivate them at every level.
Marks	The weightage would be given by CBSE.
Assessment Questions	1. A NGO want to use a vacant triangular plot in the village whose sides are 9cm, 12cm and 15cm for imparting free education to villagers. What is the area of the plot? 2. The perimeter of a triangular ground is 900 m and its sides are in the ratio 3 : 5 : 4. Using Heron's Formula, find the area of the ground. 3. Find the area of a Δ, two sides of which are 8 cm and 11 cm and the perimeter is 32 cm. 4. The length of the adjacent sides a parallelogram are respectively 51cm and 37cm. One of its diagonal is 20cm. Find the area of the parallelogram. 5. Find the cost of levelling the ground in the form of a triangle with sides 40 m, 70 m and 90 m at Rs 4 per sq.m. An organisation wants to conduct an environment awareness programme in which they will plant plants around the boundary of the ground.

DAY	ONE
Objective	Enhance ability to accurately recognize and developing the sense to creativity and critical thinking .
Assessment of qualifying knowledge	Activity based on different shapes to divide them into triangular portions to find their sides to calculate the area of those specific shapes.
Learning Outcomes	<u>KNOWLEDGE</u>- Students will know and identify the shapes by analyzing the triangles involved in the given shapes of fields. <u>SKILLS and COMPETENCIES</u> Students would be able to Analyse effectively and will be able to critically describe the number of triangles involved to find the total area of the given field.
Transaction Methodology (The teacher can use the mentioned techniques, wherever applicable, and can use any other too.)	Strategies Used : Inductive Deductive Reasoning, Graphic Organizers, Think, pair and share, Dimensions of Learning : D1,D3 Transaction would proceed in the following manner- Anticipatory Set: 10 min Facilitator will ask few questions to introduce the topic • What is area of triangle? • How to find area of quadrilateral? • What is perimeter of any shape provided? • How many triangle will you get in a pentagon? Discussion of topic through Collaborative Learning: 15 min <u>Inquiry based learning</u> (Critical Thinking and Problem Solving) Students would be asked to write different real life situations in which they are supposed to analyse the number of triangles involved. The facilitator would take rounds and ensure that each learner is engaged. Guided practice: 10 min The students will solve the questions from NCERT book, solved examples before Ex 12.1 in their notebook in the class with the help of their facilitator. The facilitator would take rounds and help the students in solving the questions. Independent Practice: Students will go through the solved examples before Ex 12.1 of NCERT text book. Closure: 5 min A short oral test would be taken to check proper assimilation of the topic discussed.
Resources	Text Book: NCERT text book for Mathematics Reference Book 1. CBSE Exemplar
Self Study, Home Work,	Independent Practice: Students would do the given questions in their H.W.

Assignments	notebooks.
Assessments	Oral Test (5 minutes)
DAY	TWO
Objective	Students will be able to use the Heron's formula by identifying the three different sides of different triangles in collaborative manner .
Assessment of qualifying knowledge	Different dimensions of sides provided to check the understanding of usage of Heron's formula.
Learning Outcomes	<u>KNOWLEDGE</u>- <i>Students will know and Analyse</i> the measurements of sides to calculate the area of triangles. <u>SKILLS and COMPETENCIES</u>- <i>Students will be able to identify and classify</i> the different sides of triangles in collaboration with each other.
Transaction Methodology (The teacher can use the mentioned techniques, wherever applicable, and can use any other too.)	Strategies Used : Inductive Deductive Reasoning, Dimensions of Learning : D1, D3 Transaction would proceed in the following manner- Recapitulation: 5 min Brainstorming on the previously taught concept would be done. Discussion of topic through Collaborative Learning: 15 min (Critical Thinking, Collaboration) An oral quiz will be taken and students will be asked to identify and locate various positions of different points and will be able to realize the fact that the coordinates describe a point in the plane uniquely. Guided practice: 15 min The students, with the help of the facilitator, will solve the questions from NCERT book of Exercise – 12.2 in their notebook in the class with the help of their teacher. The teacher would ensure that each student tries to be independent at the work as well as be under the teacher's guidance. Independent Practice: Students will complete the remaining HW parts given in the monthly planner of Exercise 12.2 in their Math HW notebook. Students who would difficulty in solving the problem would solve with the help of their buddies. Closure: 5 min A short oral test would be taken to check proper assimilation of the topic discussed.
Resources	Text Book: NCERT text book for Mathematics Reference Book 1. CBSE Exemplar
Self Study, Home Work, Assignments	Independent Practice: Students would do the given questions in their H.W. notebooks.

Assessments	Oral quiz (5 minutes)
DAY	THREE
Objective	To solve the questions of Exemplar to practice the concept of Heron's formula with differently measured sides of triangles.
Assessment of qualifying knowledge	Different shapes of fields with differently leveled sides provided to check the understanding of usage of Heron's formula by dividing them into triangles.
Learning Outcomes	<u>KNOWLEDGE</u>- Students will develop the ability to analyse the triangles involved in different shapes of fields. <u>SKILLS and COMPETENCIES</u> - Students would be able to critically apply the concepts in given situations and collaboratively analyze and identify to get the number of triangles to find total area of the field provided.
Transaction Methodology (The teacher can use the mentioned techniques, wherever applicable, and can use any other too.)	Strategies Used : Inductive Deductive Reasoning, Think, pair and share, muddiest point discussion Dimensions of Learning : D1, D3 Transaction would proceed in the following manner- Recapitulation: 5 min Oral test on the previous concept would be taken up. Discussion of topic through Collaborative Learning: 15 min (Critical thinking) Exemplar questions will be discussed and students will be able to solve different questions per group and then the questions will be crosschecked. Digital content will be used. The facilitator will take rounds and help students with their doubts. Guided Practice: 15 min The students will solve the questions from NCERT book of Exercise 12.1, 12.2 in their notebook in the class with the help of their teacher. The teacher will ensure that each student tries to be independent at the work as well as be under the teacher's guidance. Independent Practice: Students will complete the remaining HW parts given in the monthly planner of Exercise 12.1, 12.2 in their Math HW notebook. Closure: 5 min A short oral test would be taken to check proper assimilation of the topic discussed.
Resources	Text Book: NCERT text book for Mathematics Reference Book 1. CBSE Exemplar
Self Study, Home Work, Assignments	Independent Practice: Students would do the given questions in their H.W. notebooks.
Assessments	Written test (5 minutes)