NCERT Solutions Class 9 Maths
Chapter 10: Heron's Formula
EXERCISE 10.1

Document Information:
Class: 9 | **Subject:** Mathematics | **Chapter:** 10 | **Exercise:** 10.1
Total Questions: 6 | **Academic Year:** 2025-26
Source: www.ncertbooks.net | **Generated:** February 21, 2026

Quick Summary: In NCERT Solutions Class 9 Maths Chapter 10 Exercise 10.1, students learn to calculate the area of triangles using Heron's Formula when all three sides are known. This exercise covers fundamental problems involving equilateral triangles, scalene triangles, and real-world applications like finding areas for rent calculations, which are essential concepts for CBSE Class 9 mathematics exams.

Key Takeaways:

- Master Heron's Formula: \textArea = √s(s-a)(s-b)(s-c) where s = (a+b+c)/(2) is the semi-perimeter
- Apply the formula to find areas of equilateral triangles with side a: \textArea = √34a^2
- Solve problems involving triangles when perimeter and side ratios are given
- Practice real-world applications like calculating rent for triangular advertising spaces

Complete Solutions

Question 1

QUESTION

A traffic signal board, indicating ‘SCHOOL AHEAD’, is an equilateral triangle with side ‘a’. Find the area of the signal board, using Heron’s formula. If its perimeter is 180 cm, what will be the area of the signal board?

SOLUTION

This question involves finding the area of an equilateral triangle using Heron's formula, given its side 'a', and then calculating the area when the perimeter is 180 cm.

Step 1: Recall Heron's Formula

Heron's formula for the area of a triangle with sides , , and is given by: where is the semi-perimeter, calculated as .

Step 2: Apply Heron's Formula to the Equilateral Triangle

Since the triangle is equilateral, all sides are equal: . Therefore, the semi-perimeter is:

Now, substitute into Heron's formula:

Simplify:

Step 3: Calculate the Area when the Perimeter is 180 cm

The perimeter of the equilateral triangle is . We are given that the perimeter is 180 cm. Therefore:

Step 4: Substitute the value of 'a' into the Area Formula

Using the formula derived in step 2:

Final Answer: The area of the signal board in terms of side is , and when the perimeter is 180 cm, the area is cm².

ANSWER

√34 a^2, 900, 3 cm²

Question 2

QUESTION

The triangular side walls of a flyover have been used for advertisements. The sides of the walls are 122 m, 22 m and 120 m. The advertisements yield an earning of ₹5000 per m² per year. A company hired one of its walls for 3 months. How much rent did it pay?

SOLUTION

This problem involves calculating the area of a triangle using Heron's formula and then finding the rent paid for the advertisement.

Step 1: Calculate the semi-perimeter (s) of the triangle

The sides of the triangle are given as 122 m, 22 m, and 120 m. The semi-perimeter, , is half the perimeter of the triangle.

Where m, m, and m.

Step 2: Calculate the area of the triangle using Heron's formula

Heron's formula states that the area of a triangle with sides , , and and semi-perimeter is given by:

Substituting the values:

Step 3: Calculate the rent for 3 months

The rent is ₹5000 per m² per year. We need to find the rent for 3 months, which is of a year.

Rent for 1 year for the entire wall:

Rent for 3 months (i.e., year):

Final Answer: The rent the company paid is ₹1650000.

ANSWER

₹1650000

Question 3

QUESTION

There is a slide in a park. One of its side walls has been painted in some colour. If the sides of the wall are 15 m, 11 m and 6 m, find the area painted in colour.

SOLUTION

We are asked to find the area of a triangle with sides 15 m, 11 m, and 6 m using Heron's formula.

Step 1: State Heron's Formula

Heron's formula states that the area of a triangle with sides , , and is given by:

where is the semi-perimeter of the triangle, calculated as:

Step 2: Calculate the semi-perimeter,

Given the sides m, m, and m, we calculate as follows:

Step 3: Apply Heron's Formula

Now we substitute the values of , , , and into Heron's formula:

Step 4: Simplify the square root

We can simplify as follows:

Step 5: State the final answer

The area of the painted wall is m.

ANSWER

$20\sqrt{2}$ m²

Question 4

QUESTION

Find the area of a triangle two sides of which are 18 cm and 10 cm and the perimeter is 42 cm.

SOLUTION

This question requires us to find the area of a triangle given two sides and the perimeter. We will use Heron's formula to calculate the area.

Step 1: Find the length of the third side

Let the sides of the triangle be , , and . We are given cm, cm, and the perimeter cm.

We know that the perimeter is the sum of all sides:

Substituting the given values:

cm

Step 2: Calculate the semi-perimeter

The semi-perimeter, , is half of the perimeter:

cm

Step 3: Apply Heron's formula

Heron's formula for the area of a triangle is:

Substituting the values , , , and :

Final Answer: The area of the triangle is cm².

ANSWER

$21\sqrt{11}$ cm²

Question 5

QUESTION

Sides of a triangle are in the ratio of 12 : 17 : 25 and its perimeter is 540 cm. Find its area.

SOLUTION

This question involves finding the area of a triangle given the ratio of its sides and its perimeter. We will use Heron's formula to calculate the area.

Step 1: Find the actual lengths of the sides

Let the sides of the triangle be , , and . The perimeter is given as 540 cm. Therefore:

So, the sides are:

cm

cm

cm

Step 2: Calculate the semi-perimeter (s)

The semi-perimeter, , is half of the perimeter:

cm

Step 3: Apply Heron's formula

Heron's formula for the area of a triangle is:

Substituting the values:

Final Answer: The area of the triangle is 9000 cm².

ANSWER

9000 cm²

Question 6

QUESTION

An isosceles triangle has perimeter 30 cm and each of the equal sides is 12 cm. Find the area of the triangle.

SOLUTION

This question involves finding the area of an isosceles triangle using Heron's formula, given its perimeter and the length of its equal sides.

Step 1: Find the length of the third side

Let the equal sides be and , and the third side be . We are given that cm and cm. The perimeter is 30 cm.

We know that the perimeter of a triangle is the sum of all its sides:

Substituting the given values:

cm

Step 2: Calculate the semi-perimeter

The semi-perimeter, , is half of the perimeter:

cm

Step 3: Apply Heron's formula

Heron's formula for the area of a triangle is:

Substituting the values , , , and :

Final Answer: The area of the triangle is cm².

ANSWER

9√15 cm²

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Key Formulas

Important Formulas for Exercise 10.1

Formula / Concept	Description
Area of a Triangle	The standard formula to calculate the area of a triangle is (1)/(2) × \textbase × \textheight. However, this requires the height of the triangle.
Perimeter of a Triangle	The perimeter of a triangle is the sum of the lengths of its three sides. If a, b, and c are the sides of the triangle, the perimeter is a + b + c.
Semi-perimeter of a Triangle (s)	The semi-perimeter is half of the perimeter of the triangle. It is a necessary component for Heron's Formula. The formula to calculate the semi-perimeter is: s = (a + b + c)/(2) where a, b, and c are the lengths of the three sides of the triangle.
Heron's Formula for Area of a Triangle	This formula is used to find the area of a triangle when the lengths of all three sides are known, without needing the height. The formula is given by: \textArea = √s(s-a)(s-b)(s-c) where 's' is the semi-perimeter and 'a', 'b', and 'c' are the lengths of the sides of the triangle.

Top FAQs

Q1. How many questions are in NCERT Solutions Class 9 Maths Chapter 10 Heron's Formula Exercise 10.1 for CBSE 2025-26?

Exercise 10.1 of NCERT Solutions Class 9 Maths Chapter 10 Heron's Formula contains exactly 6 questions. These questions focus on applying Heron's Formula to calculate the area of triangles when three sides are given, providing step by step solutions for CBSE board exam 2025-26 preparation.

Q2. Where can I download free PDF of NCERT Solutions for Class 9 Maths Chapter 10 Heron's Formula Exercise 10.1?

You can download the free PDF of NCERT Solutions for Class 9 Maths Chapter 10 Heron's Formula Exercise 10.1 from official NCERT website and various educational platforms. These step by step solutions are available for free PDF download and are updated according to the latest CBSE syllabus 2025-26.

Q3. How many marks does Heron's Formula Chapter 10 carry in CBSE Class 9 Maths board exam 2025-26?

Heron's Formula from NCERT Class 9 Maths Chapter 10 Exercise 10.1 carries 4 marks weight in CBSE board exam 2025-26 under Unit V - Mensuration. This weightage is shared with other mensuration topics, making it important for scoring well in the examination.

Q4. Which is the most difficult question in Exercise 10.1 of NCERT Solutions Class 9 Maths Chapter 10 Heron's Formula?

Question 6 is considered the most difficult in Exercise 10.1 of NCERT Solutions Class 9 Maths Chapter 10 Heron's Formula as it involves practical application and complex calculations. Students can refer to step by step solutions and free PDF download materials to understand the problem-solving approach for CBSE board exam 2025-26.

Q5. What is Heron's Formula for Area of Triangle in NCERT Solutions Class 9 Maths Chapter 10 Exercise 10.1?

Heron's Formula for Area of Triangle in NCERT Class 9 Maths Chapter 10 is: Area = √[s(s-a)(s-b)(s-c)], where s = (a+b+c)/2 is the semi-perimeter and a, b, c are the three sides of the triangle. This formula from Exercise 10.1 is crucial for CBSE board exam 2025-26 and helps calculate area without knowing the height.

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