1   Formulas and definitions

The semiperimeter of a shape is equal to half of its perimeter.

Heron's formula for area of a triangle: $A = \sqrt{s(s-a)(s-b)(s-c)}$

Area of a triangle from inradius and semiperimeter: $A = rs$

Circumradius of a triangle: $R = \dfrac{abc}{4\sqrt{s(s-a)(s-b)(s-c)}} = \dfrac{abc}{4A}$

The area of a cyclic quadrilateral (a quadrilaterals where all of the vertices lie on one circle) can be calculated with Brahmagupta's formula: $K = \sqrt{(s-a)(s-b)(s-c)(s-d)}$

2   Questions

2.1   Question 1

Calculate the sides of a triangle $\triangle ABC$ with area $883\,\text{cm}^2$, if the ratio of the sides is $a : b : c = 15 : 7 : 19$.

2.2   Question 2

A rhombus has a side length of $23\,\text{cm}$ and one of its diagonals is $36\,\text{cm}$ long. Calculate its area.

2.3 Question 3

Calculate the circumference of the circle inscribed in a triangle with sides 418, 59, and 430.

2.4 Question 4

In a newly built park, there will be a permanently placed rotating sprayer in order to irrigate the lawns. Determine the largest radius of the circle which can be irrigated by sprayer P, so not to spray park visitors on line AB. Distance $AB = 55\,\mathrm{m}$, $AP = 36\,\mathrm{m}$ and $BP = 28\,\mathrm{m}$.