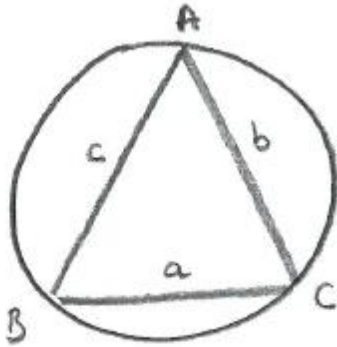


MAT Problems - Geometry (2 pages; 19/9/17)

[Note: These are all included in the STEP Problems]

(1) ABC is a triangle circumscribed by a circle of radius R, as shown in the diagram below.



Show that (i) $\frac{a}{\sin A} = 2R$ (ii) the area of the triangle is $\frac{abc}{4R}$

(2) Find the equation of the circle passing through the points

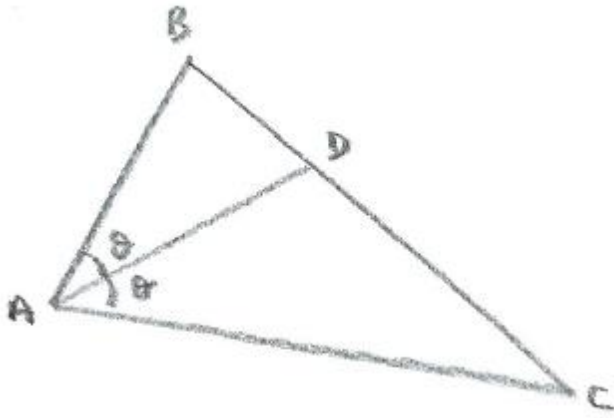
A (2,8) , B (7,3) and D (5,7)

(3) Angle Bisector Theorem

Referring to the diagram below, the Angle Bisector theorem says that

$$\frac{BD}{DC} = \frac{AB}{AC}$$

Prove the Angle Bisector Theorem.



(4) Find the shortest and longest distances from the point (3,4) to the circle $x^2 + y^2 = 144$ (justifying any assumptions you make).