Triangles in Circles

* The triangle **inscribes** the circle.
(A shape inscribes another if it is inside and its boundaries touch but do not intersect the outer shape)
* The circle **circumscribes** the triangle.
* If the circumscribing shape is a circle, it is known as the **circumcircle** of the triangle.
* The centre of a circumcircle is known as the **circumcentre**.





Examples

1. The points $A\left(-8,1\right), B\left(4,5\right),C\left(-4,9\right)$ lie on a circle.

a) Show that $AB$ is a diameter of the circle.

2. The points $A\left(0,2\right), B\left(2,0\right),C\left(8,18\right)$ lie on the circumference of a circle. Determine the equation of the circle.

Extension

*[STEP 2009 Q8 Edited]* If equation of the circle $C$ is $\left(x-2t\right)^{2}+\left(y-t\right)^{2}=t^{2}$, where $t$ is a positive number, it can be shown that $C$ touches the line $y=0$ as well as the line $3y=4x$.

Find the equation of the incircle of the triangle formed by the lines $y=0$, $3y=4x$ and $4y+3x=15$.

**Note**: The incircle of a triangle is the circle, lying totally inside the triangle, that touches all three sides.

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