

Problem of the Week

Problem E and Solution

What's Your Angle Anyway III?

Problem

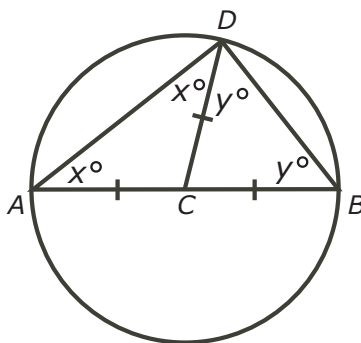
AB is a diameter of a circle with centre C . D is a point on the circumference of the circle other than A and B . Determine the measure of $\angle ADB$.

Solution

Join D to the centre C . Since CA , CB and CD are radii of the circle, $CA = CB = CD$.

Since $CA = CD$, $\triangle CAD$ is isosceles and $\angle CAD = \angle CDA = x^\circ$.
 Since $CB = CD$, $\triangle CBD$ is isosceles and $\angle CBD = \angle CDB = y^\circ$.

This new information is marked on the following diagram.



The angles in a triangle add to 180° so in $\triangle ABD$

$$\begin{aligned}
 \angle ADB + \angle DAB + \angle DBA &= 180^\circ \\
 (x^\circ + y^\circ) + x^\circ + y^\circ &= 180^\circ \\
 2(x^\circ + y^\circ) &= 180^\circ \\
 x^\circ + y^\circ &= 90^\circ
 \end{aligned}$$

But $\angle ADB = x^\circ + y^\circ$ so $\angle ADB = 90^\circ$.

This result is often expressed as a theorem for circles:

An angle ($\angle ADB$) inscribed in a circle by the diameter (AB) of a circle is 90° .

