Proof Without Words

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1 Introducing the Problem

Given: $\overline{AC}$ and $\overline{BD}$ are two vertical chords in a circle (O, r), $(\overline{AC} \perp \overline{BD})$.

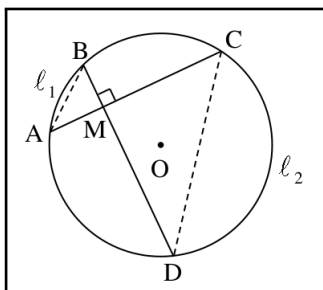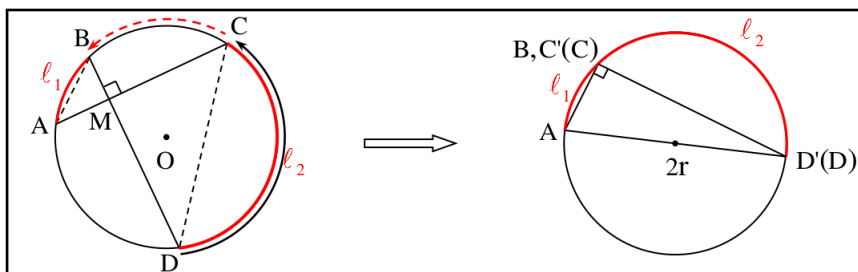**Prove:** $AB^2 + CD^2 = 4r^2$

2 Proof

Fig. 1

Fig. 2

$m\angle AMB = 90° \implies m\angle \overset{\frown}{AB} + m\angle \overset{\frown}{CD} = 180°$

$\overset{\frown}{CD} = \overset{\frown}{C'D'} \implies \overset{\frown}{AD'} = \frac{1}{2} \cdot 2\pi r \implies m\angle ABD' = 90° \implies AD' = 2r$

$AD' = 2r \implies AB^2 + CD^2 = (2r)^2 = 4r^2$

Dr. Avi Siegler has studied mathematics education in secondary schools for almost four decades. In recent years he has worked as a senior lecturer in various colleges of Teacher Education. In addition, he has published many articles in the field of geometric constructions, with particular emphasis on special features that exist in different geometric shapes.

Moshe Stupel, stupel@bezeqint.net, is a professor and a pre-service teacher educator in two academic colleges, Shaanan Academic College and Gordon College. He has published and presented 40 papers on mathematics and mathematics education. Recently, his research is focused on various methods of problem solving and on variance and invariance property in dynamic geometrical environments (DGEs) in mathematics.
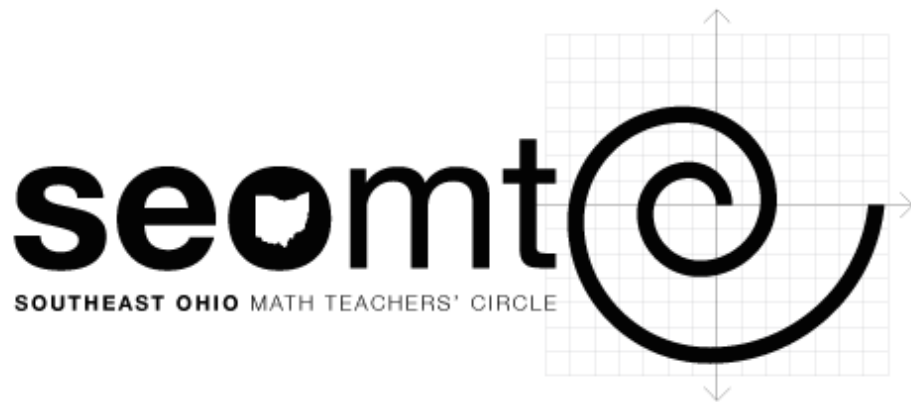
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