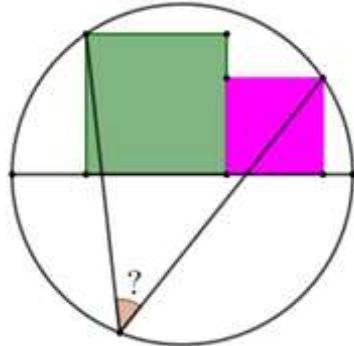


Calculate the missing angle

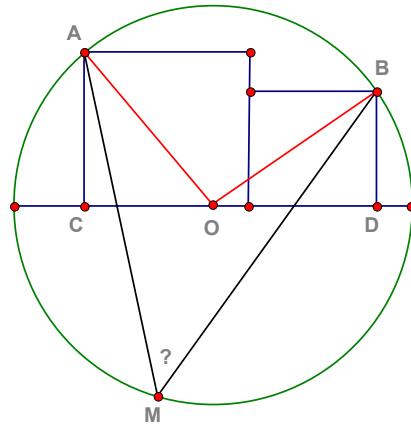
<https://www.linkedin.com/feed/update/urn:li:activity:6634921688813436928>

Calculate the missing angle (?), given the squares constructed on the circle's diameter and touching the circle, as shown



Solution by Arkady Alt, San Jose ,California, USA.

For any such configuration (there are infinitely many of them) value of the missing angle is the same, namely 45° .



Let $\varphi := \angle AMB, \alpha := \angle AOC, \beta := \angle BOD, a := AC, b := BD$. Assuming $R = 1$ we obtain $AC = \sin \alpha, CO = \cos \alpha, BD = \sin \beta, DO = \cos \beta$. Hence $CO + OD = AC + BD \Leftrightarrow \cos \alpha + \cos \beta = \sin \alpha + \sin \beta \Leftrightarrow 2 \cos \frac{\alpha + \beta}{2} \cos \frac{\alpha - \beta}{2} = 2 \sin \frac{\alpha + \beta}{2} \cos \frac{\alpha - \beta}{2} \Leftrightarrow \cos \frac{\alpha + \beta}{2} = \sin \frac{\alpha + \beta}{2} \Leftrightarrow \frac{\alpha + \beta}{2} = \frac{\pi}{4} \Leftrightarrow \alpha + \beta = \frac{\pi}{2} \Rightarrow \varphi = \frac{\pi - (\alpha + \beta)}{2} = \frac{\pi}{4}$.
