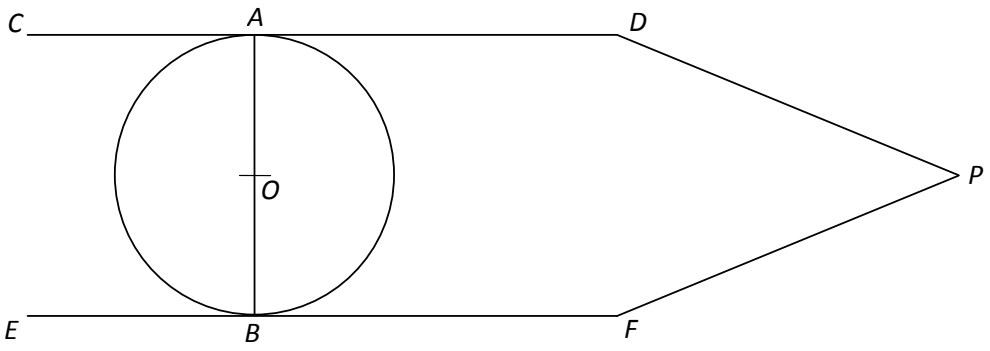
Question #38228, Math, Other

Prove that tangents drawn at the ends of a diameter of a circle are parallel.

Solution

Let *AB* be the diameter of a circle with the center *O*, the tangent line *CD* have the tangency point *A* and the tangent line *EF* have the tangency point *B* (see the figure).



Since the tangent *CD* has only one common point *A* with the circle, then *OA* is the shortest distance from the center *O* to any point of the tangent *CD*, and hence the diameter *AB* is perpendicular to the line *CD* and *vice versa*. Similarly, the tangent line *EF* is perpendicular to the diameter *AB*.

If we assume that these two tangents intersect at some point *P*, then two perpendiculars to the line *AB* will be dropped from this point, which is impossible. Therefore, we were wrong to assume there was a point of intersection. The tangents do not intersect – they are parallel.