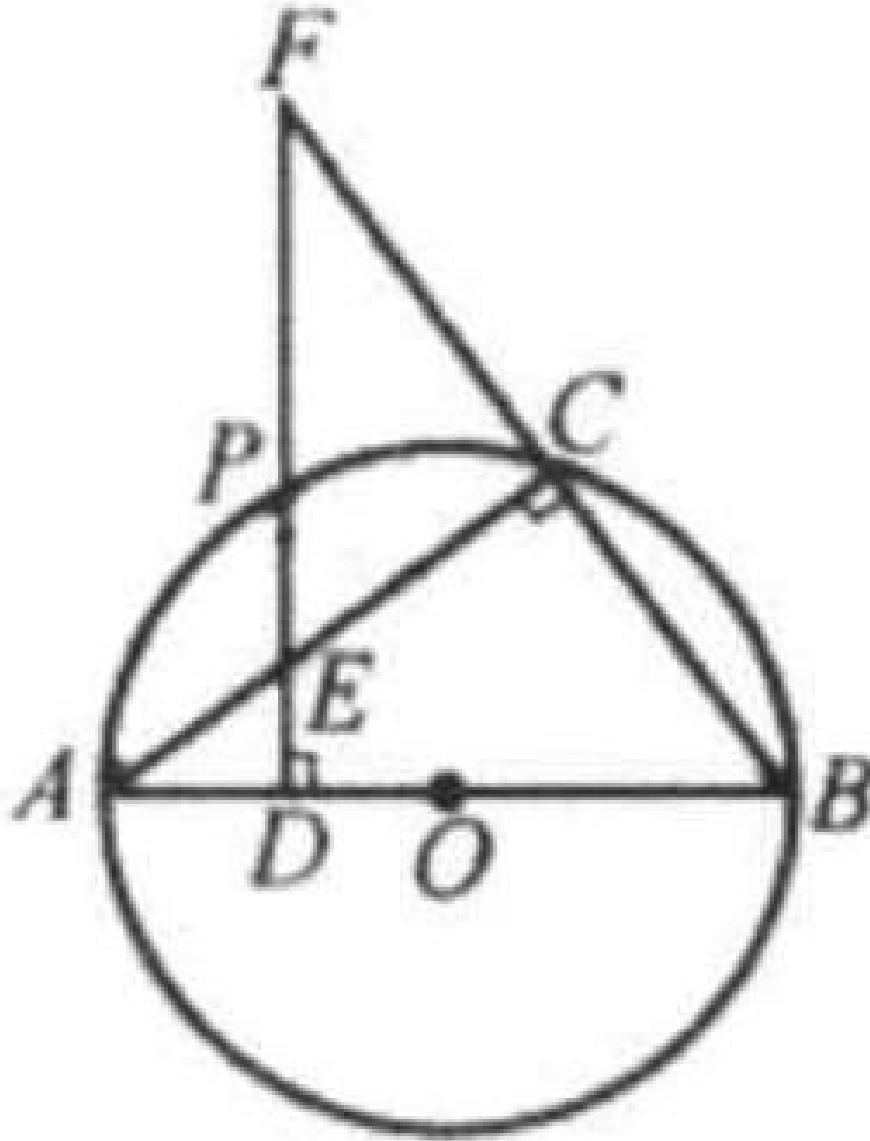


Problem 6

Problem

AB is the diameter of circle O . C is a point on the circumference. P is a point on the circumference PF is perpendicular to AB . PF meets AC at E , AB at D and the extension of BC at F . Show that $DP^2 = DE \cdot DF$.



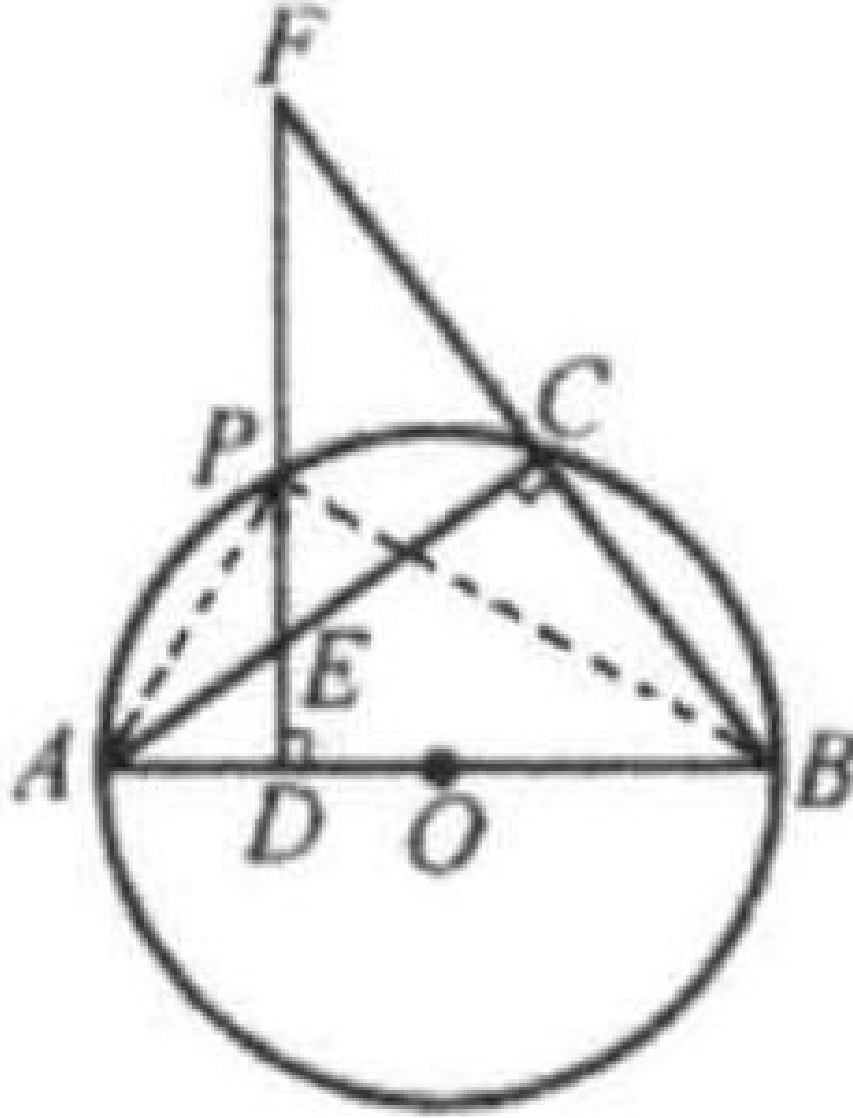
Solution

Connect PA and PB . AB is the hypotenuse of right triangles APB and ACB ,
so $\angle APB = 90^\circ$ and $\angle ACB = 90^\circ$.

Since triangle APB is a right triangle, $DP^2 = AD \cdot DB$.

Instead of showing that $DP^2 = DE \cdot DF$, we can now prove that
 $AD \cdot DB = DE \cdot DF$.

Note that $\triangle ADE \sim \triangle FDB$.
 We know that $\angle F = \angle EAD$, and $\angle ADE = \angle FDB = 90^\circ$.



Therefore $\triangle ADE \sim \triangle FDB \Rightarrow \frac{AD}{DE} = \frac{DF}{DB} \Rightarrow AD \cdot DB = DE \cdot DF$.