Problem M9 (Materials and Structures)

In the truss shown below determine the deflection of point D under the 10kN load shown (horizontal and vertical components). The force-displacement relationship for the bars (in the absence of any temperature change) is given by $\delta = \frac{FL}{AE}$ where δ is the bar extension, L, the length of the bar, A, the bar cross-section and E the Young's Modulus. For the bars in this problem $A = 500 \times 10^{-6}\ m^2$, $E = 70 \times 10^{9}\ N/m^2$. Assume that the deformations of the bars are small compared to their length.

Angles BAC and ACD are both right angles, BC and AD are parallel to each other.