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 $d = \frac{FL}{AE}$ where $d$ 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 $A = 500 \times 10^{-6} \text{ m}^2$, $E = 70 \times 10^9 \text{ N/m}^2$. 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.