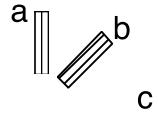**Problem M20**

A 45° strain gauge rosette attached to the surface of an aluminum alloy wing skin
panel measures the following strains:

$\varepsilon_a = -0.0025,\quad \varepsilon_b = 0.0020,\ \varepsilon_c = -0.0040$

The orientation of the gauges is shown below

a) What are the extensional stresses in the a, b and c directions?

b) What are the in-plane principal stresses?

The Young's modulus of the aluminum alloy is 70 GPa, the Poisson's ratio is 0.33
(note. the a, b, and c directions are numbered in the counterclockwise direction)