1. A two dimensional velocity field is given by the following expressions:

\[ v_1 = ax_1^2 + 2bx_1x_2 + cx_1x_2^2 \quad v_2 = a'x_1^2 + 2b'x_1x_2 + c'x_1x_2^2 \]

depending on the six parameters \( a, b, c, a', b', c' \). Determine the relations the parameters must satisfy in order for the velocity field to be incompressible.

2. Determine the form of the equilibrium equations for a plane stress condition.

3. For the plane stress state defined by

\[ \sigma_{11} = 12Ax_1^2x_2 \quad \sigma_{22} = Bx_2^3 \quad \sigma_{12} = -Cx_1x_2^2 \]

determine the constants \( B \) and \( C \) in terms of \( A \) for equilibrium with negligible body forces. Assume accelerations are negligible.