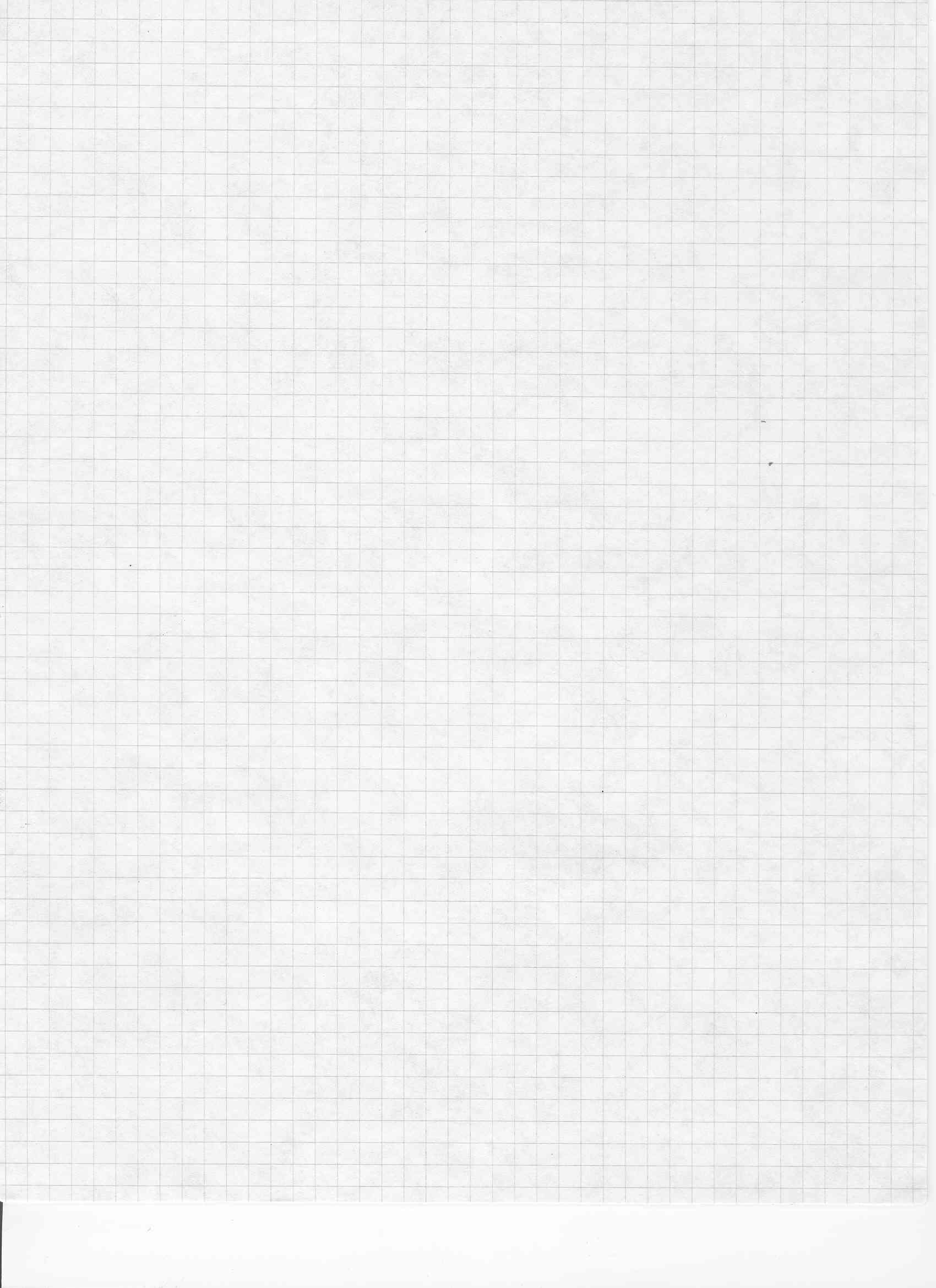
**NAME:**

**PROBLEM 1:** Given the state of stress



1. Determine the stress invariants.
2. Determine the principal stresses.
3. Determine the direction cosines to each of the principal stresses and calculate θx’x, θx’y, θx’z, θy’x, θy’y, θy’z, θy’x, θy’y, and θy’z.
4. Determine the transformation matrix from the original state of stress to the principal state of stress and prove that it is the transformation matrix by using it to transform the original state of stress.
5. Determine the state of stress defined by rotating x,y plane in the original state of stress through an angle of 30° clockwise about the z axis.
6. Determine the maximum shear stress for this state of stress.
7. Determine the transformation matrix that needs to be used to transform the original state of stress to a state of tress that contains the maximum shear stress on two of the faces and a principal state of stress on the third.
8. Draw the Mohr’s circle that defines the bounds for this state of stress.



**PROBLEM 3:** Determine the transformation matrix for rotating a state of stress on the cube shown to the surface parallel to the following surfaces:

1. CEBG
2. ABEF
3. AEG

Be sure to describe your justification for each of the coordinates used. Draw the transformed coordinate system with respect to the cube.

**PROBLEM 3:** For the state of stress in Problem 1, determine the state of complete state of strain.