Stress transformation and Mohr's circle for stresses

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1.Quiz – Answers:

1. What is the difference between plane stress and plane strain?

In plane strain the normal and shear strains in the third direction are zero. However, there may be a normal stress in z axis. In plane stress, stress acting along z axis is zero. Strain may not be zero.

2. In a plastic material which is yielding under triaxial stress, if one of the three principal stresses is increased what happens?

The increased stress will result in locating the state of stress outside the yield surface. This is not admissible. Therefore, the yield strength has to increase.

3. What happens to the volumetric strain of a material which has a Poisson's ratio of 0.5?
   Zero
4. Is it possible to have a material with Poisson's ratio more than 0.5? Explain.
   No. We know for hydrostatic compressive stress, the strain is

$$\varepsilon_x = \frac{1}{E}(\sigma_m - v(\sigma_m + \sigma_m))$$

If Poisson's ratio exceeds ½, we will have tensile strain for compressive stress as per the above equation.