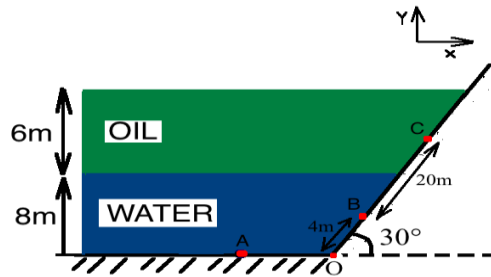


ABE 307
Homework 1
Fall 2017
Assigned: 08/25/2017
Due: 09/02/2017

1. A force of 115.47 kN is applied at a point on a body, at an angle of 60 degree with Y axis. The X component of the shear force on the XZ plane is 86.6 kN. Find the other component of the shear force on XZ plane. Also, find the angle between the force and X axis. Show your work with the body diagram for force components. (10 Points)
2. Two fluids are confined by a gate inclined at an angle of 30° as shown in the figure below. The lower fluid is water and the upper fluid (oil) has a specific gravity of 0.8. The surface of the upper fluid is at a height of 14m and the interface between the fluids is at a height of 8m with respect to the ground level. Point A is located at the ground level, points O, B and C are located along the gate with line segments OB = 4m, and BC = 20m. Calculate the pressures at points A, B, and C. (10 Points)



3. A tank is filled with a 'stratified fluid' (fluid with non-uniform density), the density of which follows a linear relationship: $\rho = \rho_o + kh$, where ' h ' is the distance measured from the liquid surface along the downward direction. If the atmospheric pressure is P_a , the height of the tank is H , and the acceleration due to gravity is g , find the pressure at the bottom of the tank. (10 point)

