Homework Problem 2

This assignment will be used to help you compare an analytical stress analysis to a stress analysis performed using finite element analysis.

Complete an **analytical stress analysis** on a flat plate with a hole drilled through the geometric center of the plate.

The plate dimensions are:

Length	=	5.00 inch	nes
Width	=	2.50 inch	nes
hole diameter	=	0.50 inch	nes
thickness of plate	=	0.125 inch	nes

The plate is in tension with a 300 lb. force imposed on the face of both ends of the plate. The plate material is steel.



Your assignment is to perform finite element analysis on the plate and compare analytical and FEA stress results. You should submit an **executive summary** that reports your findings, i.e., reports maximum stresses and the percent difference between FEA stress values and analytical stress values.

You are required to model the plate three different ways:

- 1. The whole plate as shown in the accompanying picture
- 2. Half of the plate using a cut along the "x" axis and through the center of the hole
- 3. A quarter plate--one cut being along the "x" axis and through the center of the hole and a second cut along the "y" axis and through the center of the hole.

For each model, you need to describe how you applied boundary conditions (provide a picture or print out from Solid Works) and how you applied the 300 lb. load. Report maximum stresses for each model and compare with your analytical solution. You should include a table in your summary that looks similar to the one shown below.

Model	Maximum Stress at Hole	FEA	Analytical	% difference
Full Plate				
Half Plate				
Quarter Plate				

Submit:

An executive summary with table

Drawings or print outs from Cosmos that indicate how you modeled your loads and boundary conditions