AEM 341: Exam 2 P Name:_____

28th March 2018 55 minutes 4 Pages Open book, Open notes, Calculator

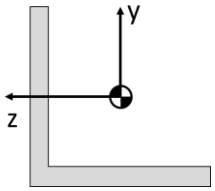
100 total points **Read, think, plan, and then write.**

University of Alabama Academic Honor Pledge:

I promise or affirm that I will not at any time be involved with cheating, plagiarism, fabrication, or misrepresentation while enrolled as a student at The University of Alabama. I have read the Academic Honor Code, which explains disciplinary procedures that will result from the aforementioned. I understand that violation of this code will result in penalties as severe as indefinite suspension from the University.

Signature:_____ Date:_____

1. [10 pts] What is the sign (+,-, or zero) of Iyz for the following part around the given centroid?



Iyz > 0	Iyz < 0	Iyz = 0	$I_{yz} = \frac{1}{12}bh^3$	None of the above

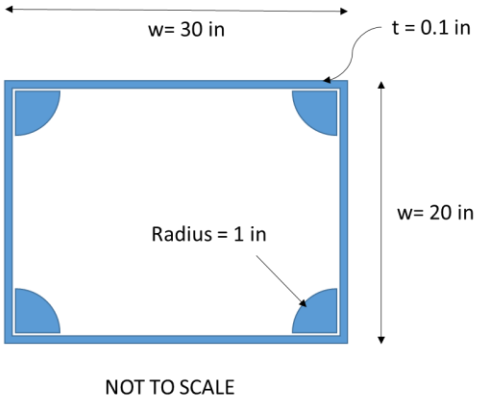
2. [10 pts] An applied load in the z-direction results in beam deflection in **only** the z-direction.

Always True	Always False	Only for a uniform load in z	True if Iyz=0	True if Iyz>0

3. [5 pts] Given a 4 x 8 foot piece of Al loaded in the 8 foot direction, which has the lowest buckling load?

4 Clamped	4 Simply Supported	3 simply supported + 1 free

4. [25 pts] Determine A^*, the centroid location, I^*_{yy} , I^*_{zz}, and I^*_{yz} for the following part. The skin is Al. The stringers are steel. Use Al as the reference E.



5. [25 pts] Will the beam **break** or **buckle** first? The Al beam has a length of 36 inches, a width of 0.25 inches, and a height of 2 inches. The ultimate stress (i.e. break) is 40 ksi.

6. [25 pts] Determine the maximum axial stress for the following cross section. The part was heated +100 F with an applied load of Mz = 1000 lbf-in.