# MECH 5312 SPRING 2018
# MOCK EXAM # 1

Name:_____

800#:_____

Date :_____

Once the Exam starts you may **NOT Leave the Room.**

The Exam is **the duration of the class and WITHOUT the aid of your book or notes**, only a one-sided one-page equation sheet is allowed (no solutions to problems on it).

Graphing Calculators are not allowed. **ONLY scientific calculators** approved for use on the FE exam are acceptable.

The **neatness of the presentation** of the answers will be considered during grading.

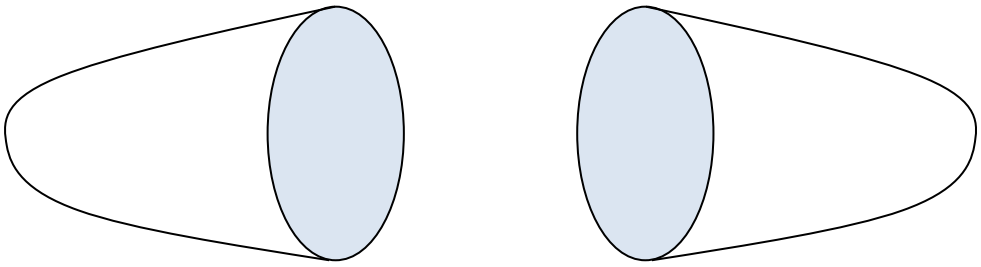
**Circle/Box Your ANSWERS. Include the Units.**

It is your responsibility to read the question, comprehend it and solve it. If the question appears unclear, ask the **instructor for clarification** during the exam.

If there is evidence that you have cheated on the exam, the exam will be declared invalid, and you will fail the course.

Name:_____

**P1)** You are given a potato subject to static equilibrium. The potato is section into two halves. Each half has an internal normal and shear stress on the cut surface. (a) Fill in the free body diagram, noting the stress and direction vectors. (b) Derive the equation of equilibrium needed to bring these two halves back together. (c) What is required of the stresses for equilibrium to be maintained in the system.



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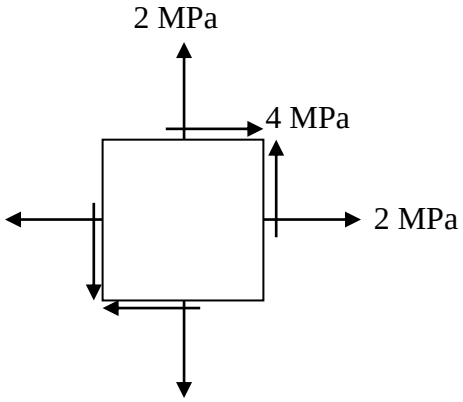
**P2)** Given the state of stress below (a) Determine the principal stresses and (b) Determine the principal directions.



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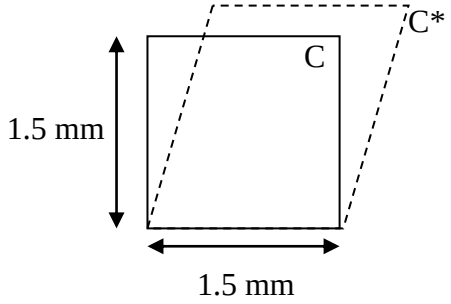
**P3)** A 2D element is deformed into the position below. The x,y position of point C (1.5 mm, 1.5 mm) is deformed to C* (1.51 mm, 1.503 mm). Determine the state of strain at point C*. Assume the displacement takes the form $u = C_1 xy, \quad v = C_2 xy$ where $C_1$ and $C_2$ are constants to be determined and $x$ and $y$ are the undeformed configuration.



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