ENGIN 22 exam 1

Programming With MATLAB for Engineers and Scientists

DUE by Thursday, October 25th at 6:50pm
No collaborations with colleagues.

Name: _____

INSTRUCTIONS:

a. Write your name on the top of the page.
b. Write legibly.
c. Show work as needed to justify your answers.
d. **Comment your code** (using % symbols).
e. **Copy and paste your scripts AND your results from MATLAB in this word document.**
f. **Save your work as one word document** (no matlab ".m" file accepted).
g. Email your work (**one attachment only**) to fpaltera@losmedanos.edu by the due date. (You will receive a confirmation email after emailing your work).

1. The area of a rectangle is length times width. Find the areas of rectangles with lengths of 1, 3, and 5 cm and with widths of 2, 4, 6, 8 cm. You should have 12 answers.

2. The following expressions describe the principal contact stresses in the x-, y-, and z- directions, respectively, when two spheres are pressed together with a force F.

$$\sigma_x = \sigma_x = -p_{\max}\left[\left(1-\frac{z}{a}\tan^{-1}\left(\frac{a}{z}\right)\right)(1-\nu_1) - 0.5\left(1+\frac{z^2}{a^2}\right)^{-1}\right]$$

$$\sigma_z = \frac{-p_{\max}}{1+\frac{z^2}{a^2}}$$

where

$$a = \sqrt[3]{\frac{3F}{8}\frac{\frac{(1-\nu_1^2)}{E_1}+\frac{(1-\nu_2^2)}{E_2}}{\frac{1}{d_1}+\frac{1}{d_2}}}$$

$$p_{\max} = \frac{3F}{2\pi a^2}$$

Determine the principal stresses when: