Problem 1 (20 points)

GPS receivers are attached to the ground and the data is recorded using a network of a network of satellites around the earth. Since GPS receivers do not move unless the ground moves, they can be used to track continental drift. Some of that data can be found on the following website: http://sideshow.jpl.nasa.gov/post/series.html

Looking at the boundary of the Pacific and North American Plates that occurs along the coast of California, chose a few data points on either side of the boundary and plot vectors from movement between 2006 and 2012. How much has each plate moved? From the movement, what can you say about the type of plate boundary?

Problem 2 (30 points)

Determine the principle stresses and directions for the following stress tensors:

a.

$$\mathbf{S} = \begin{bmatrix} 18 & 0 & 24 \\ 0 & -50 & 0 \\ 24 & 0 & 32 \end{bmatrix}$$

b.

$$\mathbf{S} = \begin{bmatrix} 3 & -10 & 0 \\ -10 & 0 & 30 \\ 0 & 30 & -27 \end{bmatrix}$$

c.

$$\mathbf{S} = \begin{bmatrix} 2 & -1 & 1 \\ -1 & 0 & 1 \\ 1 & 1 & -2 \end{bmatrix}$$

Work (a) by hand for practice. You can use a computer to solve (b) and (c) if you wish.