

Name: _____

Homework 1, GEL 161

Ch. 2 and Ch. 20 [30 pts]

1. **Plate Boundaries.** Use the plate motions shown in Figure 20.34 to identify the type of plate boundaries (convergent, divergent, conservative) corresponding to each of the following plate margins.
 - (a) Pacific – Nazca plate margin.
 - (b) Pacific – Australia plate margin.
 - (c) Nazca – South America plate margin.
 - (d) Australia – Antarctica plate margin.
 - (e) North America – South America plate margin.

Note that some margins may have more than one type of boundary. In this case, please specify which parts of the margin have each boundary type. [5 pts]

2. **Crustal Structure.** Make a sketch of the oceanic crustal structure listing each of the layers, the rock type, the density range, and the P-wave velocity (see Figure 20.27). What are the discontinuities (jumps) in the P-wave seismic velocity between each of the layers? [10 pts]
3. **Data Profiles.** Figure 27.7 shows the results of a microgravity survey: part (a) shows the full signal including the regional slope, while part (b) shows the residual anomaly after removing the regional slope. Create (by hand on graph paper or on a computer) a profile across the residual anomaly at 9850 m on the vertical (y) axis, going from 3220 m to 3390 m on the horizontal (x) axis. [5 pts]
4. **Forward and Inverse Methods.** Assume you have a set of gravity measurements along a profile that you would like to interpret in terms of the subsurface structure. You can do this interpretation using either a forward or inverse method. List the steps you would need to take to interpret the data using a forward method approach and make separate list of the steps needed using an inverse method approach. Each step will be somewhat generic (e.g., make a simple model), the important point is the order of the steps and difference in the steps used in each approach. [10 pts]