Ge 161 - Fall 2007 - Stereonet problems to be done in class review session

Name_____

STEREONETS AND SPHERICAL GEOMETRY

These problems are designed for you to review your knowledge of stereonets prior to future problem sets in which they are used. You can do these in class during the review session, or at home. You don't have to do them at all if you don't need the review. However, if you are unsure of how to do any of it, please try it so you learn how. If you can make yourself comfortable with these techniques now, it will save you time on later problem sets and in class discussions.

1. Use an equal-angle (stereographic), UPPER HEMISPHERE projection, as if looking at the earth from space. Do your work on a piece of tracing paper and attach it to this page. First, trace and label the perimeter of the stereonet. Then label points A, B, and C.

(A) Construct the spherical triangle with corner points at the following values of latitude and longitude on the earth:

A = 60, 356 (60° N, 4° W)
B = -45, 330 (45° S, 30° W)
C = 10, 210 (10° N, 150° W)
(latitude, longitude)

Note that in order to fit all three of these points into your field of view on the outside of the earth, the center longitude of your projection must be chosen carefully.

(B) Measure the distances in degrees of the sides of the triangle:

A-B _____
B-C _____
A-C _____

(C) Measure the spherical angles of each corner of the triangle:

A_____
B_____
C_____

(D) Determine the local azimuth of the great circle segment B-C at points C and B (i.e., if you are at C, looking along the great circle segment, what azimuth are you looking at?). Note that in geology azimuth is measured clockwise from North.

C_____
B_____.

2.

Use an equal angle, LOWER HEMISPHERE projection. This is the projection used in structural geology or seismology. Do your work on a piece of tracing paper and attach it to this page. Put north (N) at the top of the projection, S at the bottom, W on the left, and E on the right.

(a) Draw in and label a fault plane J that strikes N-S and dips 30° W.

(b) Draw in and label a fault plane K that strikes 320° and dips 80° NE.

(c) What is the trend and plunge of the line of intersection between planes J and K?

(d) What is the angle between planes J and K?

(e) What is the strike and dip of the plane that is perpendicular to BOTH planes J and K?

3.

Use an equal angle, LOWER HEMISPHERE projection to solve the following problem:

The vector B trends due N and plunges 63 degrees. What is its projection in a vertical plane striking N45°W?