

Name _____

STEREONETS AND SPHERICAL GEOMETRY

These problems are designed for you to review your knowledge of stereonet and spherical geometry before we use them in class or in homework. We will work on these problems in class during the review session. You can try these on your own, and 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 outer space. Do your work on a piece of tracing paper. 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 _____.

Ge 161 - Fall 2009 - Stereonet problems to be done in class review session on 10/19/09 at noon.

2.

Use an equal angle, LOWER HEMISPHERE projection. This is the projection used in structural geology or seismology. Do your work on a different piece of tracing paper. 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:

A vector B has an inclination of 40° and a declination of 11° . Find the projection of B onto a vertical cross-section trending $N45^\circ W$, and plot it on the stereonet as B'. Give the inclination and declination of B'.