**Geology 340 Midterm Exam – Review Sheet**

**Lecture topics**

Coordinate systems – basics of latitude (0-90 N and S) and longitude (0-180 E and W)

Celestial navigation –

Getting latitude from stars

Getting longitude from Greenwich time and local noon

See [sample problem](http://guilfordgeo.com/geo340/Navigation.html) on website

Map types and map goals

Projections

Main types - Cylindrical, Azimuthal, Conic

Variations - Tangent vs. Secant

Other types - pseudocylindrical, sinusoidal, polyconic, etc.

Projection goals

Conformal (angles)

Equal area

Equal distance

Tissot indicators - measuring distortion

GMT basics - Projections, regions, WESN, Command format and meaning of parts

Contouring

Hand vs. computer – benefits and costs

Computer methods:

Averaging

Triangulation

Surface fitting (spline technique and others); using tension like GMT can

GIS concepts

Spatial vs. attribute data – points, lines, polygons vs. values and traits

Vector vs. raster data

Relational databases – linking spatial and attribute data; key fields

GIS techniques

Creating maps – layers, views, menus, projections, interface, templates, basemap group

Importing data

Finding data on the web

Processing to make useful format (often in Excel)

CSV format

Using tables – linking attribute and spatial data – FIPS concept

Symbology and various representations of data we’ve used

Normalizing data

Raster and image formats (gridded data)

Bits, bytes, and representation of color (8 bit, 24 bit, alpha, indexed, etc.)

File formats – Bitmap, GIF, JPG, PNG

Compression regimes

Basics of georeferencing

Affine transformations (straight lines stay straight, parallel stay parallel)

Translation

Scaling

Rotation

Shear

Matrix notation

1st and 2nd order polynomial best-fit raster-to-spatial connections in Arc

**Laboratories**

#1 Eratosthenes, Ptolemy, Bond, etc.

#2 GMT – projections

#3 GMT – contouring

#4 ArcGIS basics

#5 ArcGIS – linking data

**Readings**

On course web page, plus GMT manual pages