**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