**Geology 340 Midterm Exam – Review Sheet**

**Lecture topics**

Coordinate systems

Celestial navigation –

Getting latitude from stars

Getting longitude from Greenwich time and local noon

See sample problem on website

Map types and map goals

Projections

 Types - Cylindrical, Azimuthal, Conic

 Tangent vs. Secant

 Other (pseudocylindrical, sinusoidal, polyconic, etc.)

Projection goals

 Conformal

 Equal area

 Equal distance

Tissot indicators - measuring distortion

Contouring

 Hand vs. computer

 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

 Layers

GIS techniques

 Creating maps

 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

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

#6 Georeferencing

**Readings**

On course web page, plus GMT manual pages