Topographic Maps

ESC 115 Physical Geology Lab

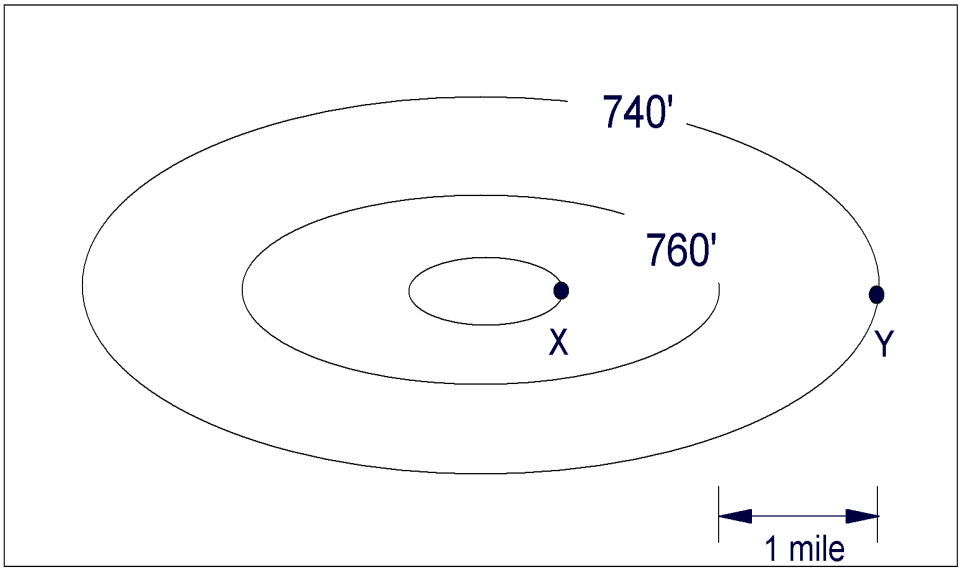
Contours and gradients

Group Members:_____ Section: _____

To begin the process of three-dimensional visuallization, we will look at an anaglyph map of the Dubuque area. This map was created by superimposing digital elevation data upon the USGS topographic maps. The anaglyph gives you a strong visual sense of the landform in the Dubuque area. Note the escarpment to the south, near the airport, and the abandoned channel through the northern part of town. This is the beginning of exploring the topography of Dubuque.

Topography is the study of the elevation of the Earth's surface—the hills and valleys, the mountains and plains. A *topographic map* shows elevation of the surface by means of *contours*. Contours are lines of equal elevation. In other words, if you walked along a hillside without going either up nor down, you would be tracing a contour line. Contours are created with a regular *contour interval*. That is, the elevation difference between any two contours is always the same for any given map. Topographic maps give you a quantitative measure of landforms.

An example of a measurement we might want to make is the gradient. Gradient equals rise over run, as we learned years ago. We measure rise by looking at the difference in elevation represented by contour lines, and we measure run by using the scale on the map. Look at the following figure, and then answer the questions below it.



1. What is the scale? 1 inch = _____

2. What is the contour interval? _____

3. What is the contour level at point X? _____

4. What is the shape the contours represent? _____

5. What is the gradient from point X to point Y? Show your calculations.

The following questions refer to the Dubuque South Quadrangle unless stated otherwise.

1. What is the contour interval? _____

2. What is the scale? 1 inch = _____

3. What is the northernmost latitude? _____

4. What is the easternmost longitude? _____

5. Locate Horseshoe Bluff along the Mississippi River. (You may want to refer to page 153.)

   - What is its Township? _____
   - What is its Range? _____
   - What is its section number? _____

6. Locate Dubuque Municipal Airport.

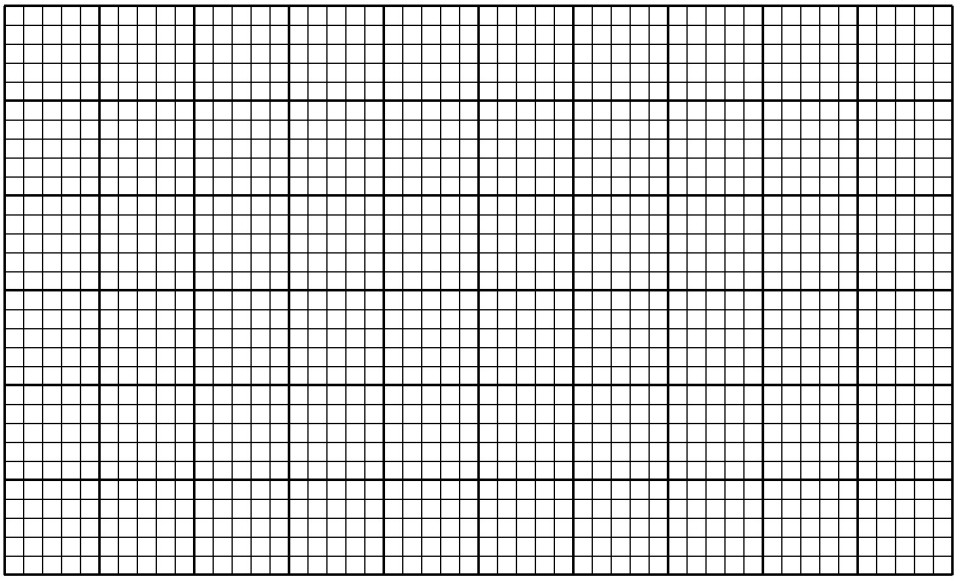
   - What is its Township? _____
   - What is its Range? _____
   - What is its section number? _____

7. What is the approximate elevation of Chalmers Field? _____

8. What is the approximate elevation of Mt. Carmel Convent? _____

9. Note the average elevation of the Mississippi River. What is the average gradient from Mt. Carmel Convent to the Mississippi River? Show your calculations.

10. Consult http://www.cs.nmsu.edu/~jbj/index_auxil/idaho_virtual_campus/topo_profiles.htm for instructions on constructing a topographic profile. Locate Section 6 in Township 88 North and Range 3 East. Construct a profile from the north to south in the middle of the section crossing over Catfish Creek. Note on your diagram the present and former location of Catfish Creek. Use the grid below for your profile.



Outside of lab

Turn in at the beginning of lab next week your own map of the geology of Iowa. Use the National Atlas program's Map Maker, available at

http://www.nationalatlas.gov/natlas/Natlasstart.asp

- Click on the *Zoom to State* drop-down menu and choose Iowa.
- Under the *Geology* layer, turn on *Geologic Map* and all its options (labels, etc.).
- Locate Dubuque and then click on the Map key tab. What age rock is Dubuque located on, according to the classification used in the map?
- Print out the geologic map, and hand it in.