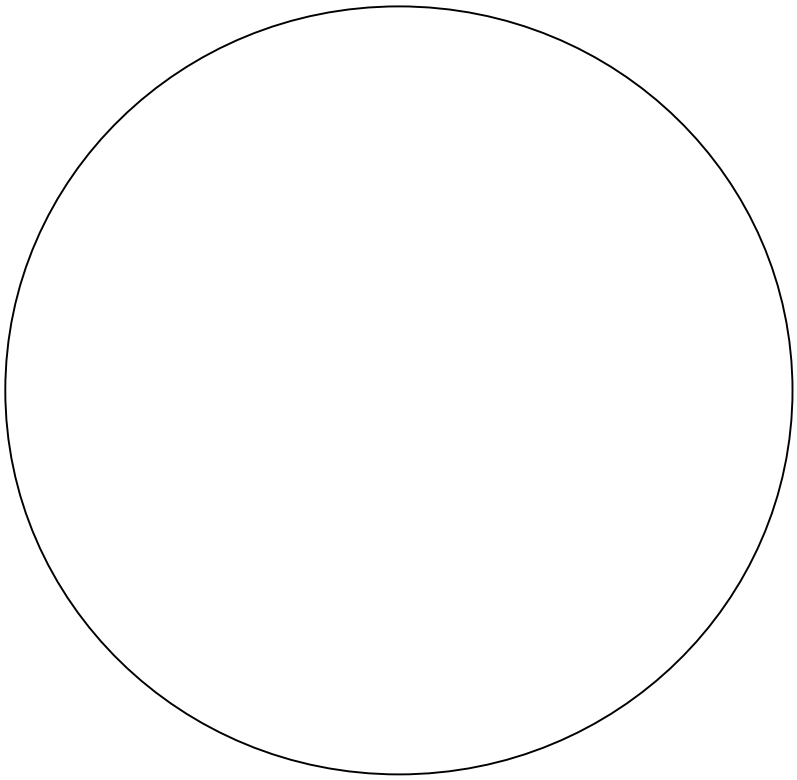
Geophysics - due Monday10/22 (turn them in earlier if you want feedback before the exam)

1. Using the dipole equation {Tan(I) = 2 Cot(θ)}, make a graph of graph inclination from the north pole to the south pole. On the same graph, plot the magnitude of magnetization from pole to pole.

2. On the circle (or one of your own), accurately plot vectors for a uniformly magnetized sphere every 15^o and draw on the contours of equal inclination (use unit radius and magnetization). Next, accurately (points every 15^o) draw at least one contour of field strength in the plane of the section – make it so it just touches the sphere at the magnetic equator.



3. Suppose the magnitude of Earth's field at Missoula is 62,000 nT. Assume the north magnetic pole is coincident with the geographic (spin) axis and that Earth is a uniformly magnetized sphere and calculate the magnetic dipole moment (M) of Earth – what are the MKS (SI) units of your result?.

4. Play with MagCad for while until you are comfortable with magnetic anomalies. Ask yourself some appropriate questions and answer them to your satisfaction using MagCad. For example:

- Is there a rule of thumb for anomaly width versus depth?
- How does the anomaly change for a dike when the dip changes?
- If there is a shallow source directly over a deep source, what is the best way to separate the two (total field or gradient?
- How would I design a magnetic survey to detect mineralized veins with k=.01 (SI) whose average width is 3-5 meters?

You don't need to turn anything in for number four but I want you to think about magnetic anomalies.