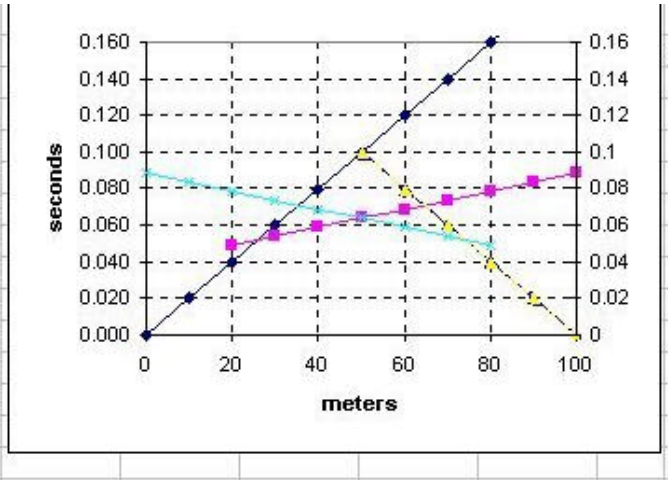
Geology 437 – Midterm exam, Fall 2002 Who?_____
For all questions, show and explain sufficiently for me to follow your thinking

1. Consider the following first-arrival results and answer the questions as best you can:

	Forward Line	
x	direct	refracted
0	0.000	
10	0.020	
20	0.040	0.049
30	0.060	0.054
40	0.080	0.059
50	0.100	0.064
60	0.120	0.069
70	0.140	0.074
80	0.160	0.079
90	0.180	0.084
100	0.200	0.089



	Reversed Line	
x	T direct	T refracted
100	0.000	
90	0.020	
80	0.040	0.049
70	0.060	0.054
60	0.080	0.059
50	0.100	0.064
40		0.069
30		0.074
20		0.079
10		0.084
0		0.089

a. How many layers are indicated by the results? How do you know?

b. Interpret the results as best you can – provide as much information about the subsurface as possible. Show your work on the back of one of these pages.

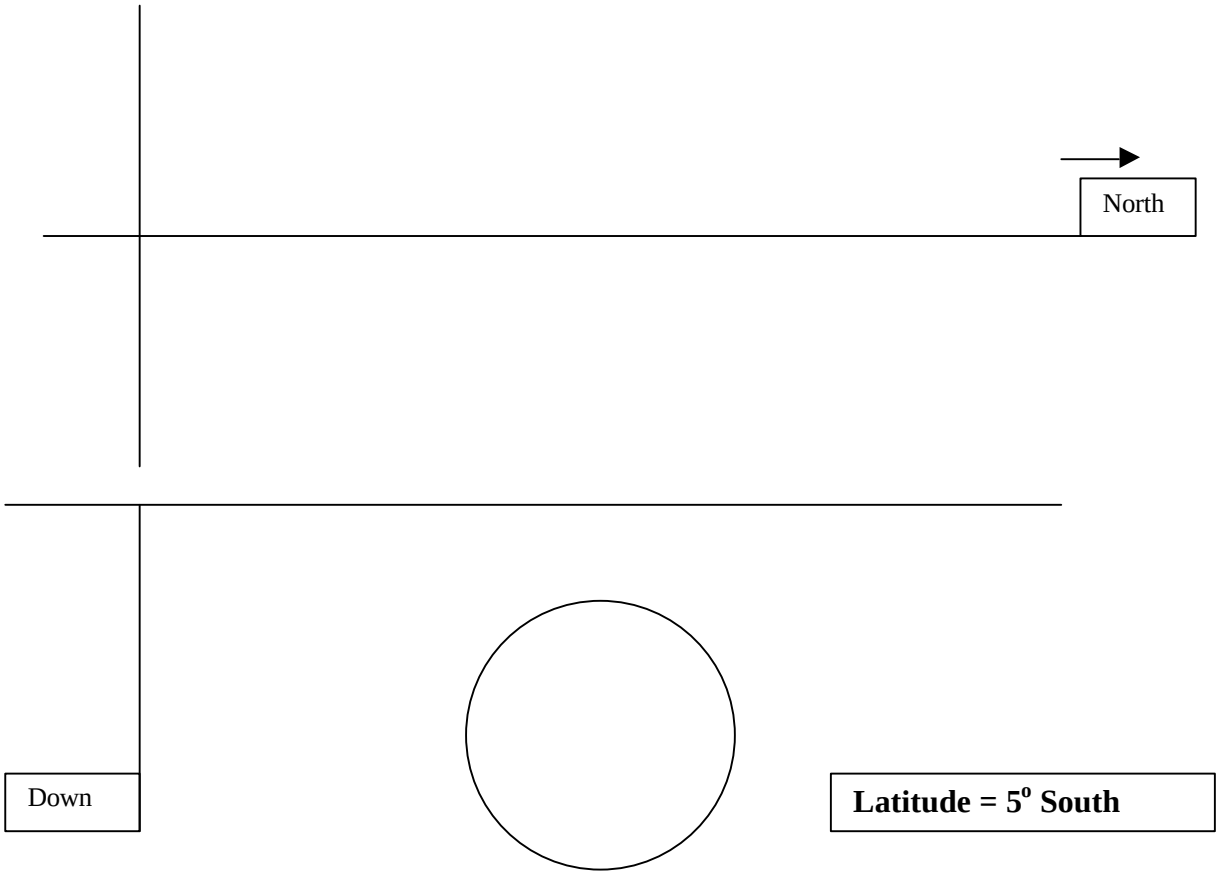
c. Imagine you are giving a short report to a client. What caveats or potential pitfalls of your interpretation can you provide and what are your assumptions?

2) For the diagram below, assume that Earth's dipolar magnetic field is aligned with the spin axis, **Latitude is 5^o South,** and magnetic north is to the right:

a) Draw an arrow showing the magnetic field vector and label the inclination in degrees.

b) Draw the **induced magnetization** in the buried sphere and some reasonably neat and accurate **flux lines**

c) Label the graph and draw the expected **total-field anomaly**..



3. Suppose a large sequence of late Proterozoic (700 mybp) rocks in western Montana (47^{o}N, 115^{o}W) reliably yields an average declination of -43^{o} and an inclination of 22^{o}.

a. What can you say about the paleolatitude of those rocks and their subsequent tectonic history?

b. What can you say about the paleolongitude of those rocks and why?

c. What are your main assumptions?

d. Sketch and label the coordinate system that declination and inclination are commonly measured in:

4. Provide brief, concise, accurate and geophysically relevant definitions and/or explanations of the following:

   a. law of refraction

   b. blind zone

   c. S wave

   d. Huygen’s principle

   e. signal stacking