Geology 437 – Seismology and Magnetics, Fall 2002. Problem set #2 due Monday 9/16

1. Assume that the water table below the area on the map is a planar surface.

a. What is the expected depth of the water table at A and B on the map?

Well	Elevation	Depth to Water Table
1	981.5	4.5
2	982.5	3.5
3	981.5	4.5

P-wave velocity in unsaturated layer:	975 m/s
P-wave velocity in material below water table:	1745 m/s

b. Use the 2-layer seismic refraction equations from class to construct the expected results from a reversed (2-way) seismic refraction line between A and B on the map. Make it neat, and tidy – use a spreadsheet.

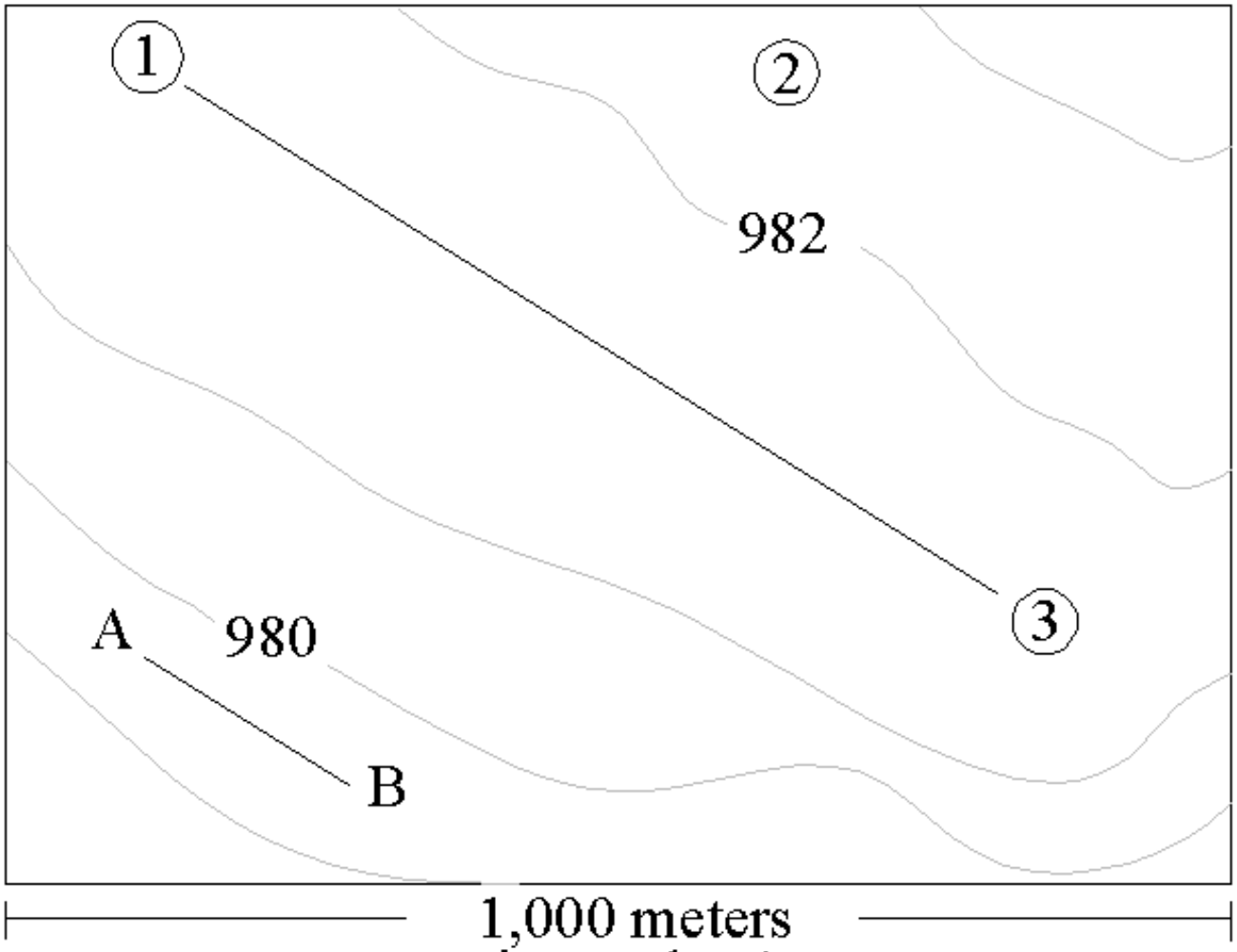
c. You now have expected results based on simple observations and assumptions. How would you distribute 12 geophones to best test your model? Why?

d. On one diagram, graph the 1-way results for the above situation for two additional cases:

i. the same depth as you found above but with V2 50% higher at 2,618 m/s.

ii. the same velocities as above but with twice the depth you found.

Briefly comment on the implications of these results for designing seismic refraction experiments. For example, how does increasing depth and/or velocity change the way you would distribute geophones?


1
2
982
3
A
980
B
1,000 meters
contour interval = 1 meter