1. Give thorough but concise definitions for 5 of the following:
   a. CMP
   b. Poisson's ratio
   c. Head wave
   d. Rayleigh wave
   e. Huygen's Principle
   f. Statics correction
   g. Hidden layer
2. Using the information on the diagram below, what must the angle of incidence of a seismic ray be on the 1-2 interface to cause a critically refracted wave (a) on the 1-2 interface, (b) on the 2-3 interface, and (c) on the 3-4 interface. For case (c) sketch the proper ray path on the diagram.

\[ \begin{align*}
&\text{shot} \\
V_1 &= 1900 \text{ m/sec} \\
V_2 &= 1500 \text{ m/sec} \\
V_3 &= 2400 \text{ m/sec} \\
V_4 &= 6000 \text{ m/sec}
\end{align*} \]

3. Various types of seismic velocities are used in the processing and interpretation of the seismic reflection data, what are the different types and what is each used for?
4. The forward and reverse shot seismic refraction plot shown below indicates a bedrock refractor that is quite irregular. If the reciprocal time for the forward and reverse shots is 40.7 msec, what is the depth to the bedrock under the geophone located at 50 meters. A time difference plot of the data is also shown below.
5. A reversed E-W profile across the western edge of a drift filled valley is shown below along with the interpreted cross-section. Determine the dip of the erosional surface between the bedrock and drift assuming a planar surface. What is the vertical depth to the bedrock at the west end of the profile?
6. Using the “x-t” and “x²-t²” plots shown below, determine the depths to the two reflectors. What is the normal moveout across the geophone spread associated with each reflector. If a refraction survey were conducted in the same area, what would be the crossover distance?
7. The time-distance plot below either indicates a two layer case or a vertical contact separating a surface layer with different velocities. How would an off-end shot or shots placed on the left hand side of the spread help resolve the dilemma?

8. In Dr. Richard Blakely's talk on using gravity and aeromagnetics for understanding the near-surface geology and hydrogeology of the Nevada Test Site and Death Valley National Park, Dr. Blakely converted the aeromagnetic data to pseudo-gravity data. Why?
9. To find the depth to bedrock, a seismic refraction survey was conducted using 15 meter spacing between the geophones. The data are shown below. Determine the thickness of the overburden stating any assumptions you use in solving the problem.