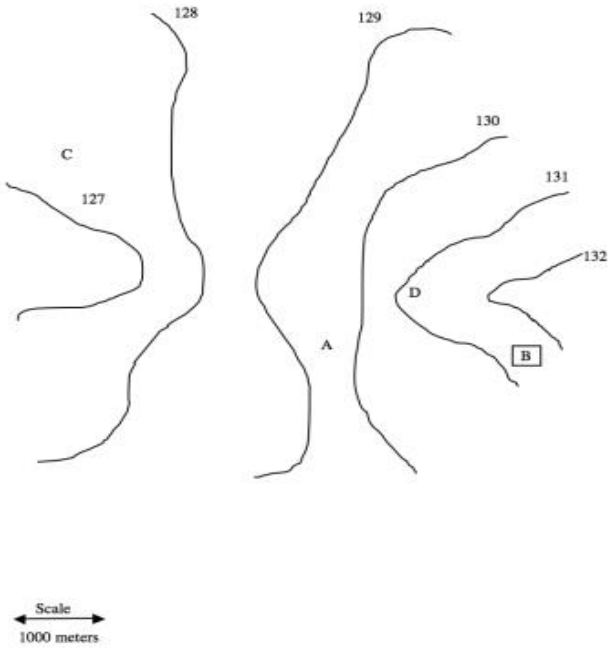
Week 2 Homework

1. In a 100-hectare watershed, the water table drops by 5m. If the porosity of the area is 30% and the specific retention is 10%, calculate the specific yield of the aquifer and the change in ground water storage (m^3).

2. Figure 1 is an aerial view of a portion of a confined aquifer. Assume that the aquifer is much larger than the region shown. The contour lines shown were derived from head measurements in a series of observation wells. The measured head is given in units of meters above mean sea level. Assume that there is only horizontal flow in this aquifer and that flow is at steady state.
    a. Estimate (by hand or otherwise) the direction and magnitude of the hydraulic gradient at point A.
    b. You are told that there have historically been contaminants in the aquifer within the box around point B. If you assume that the aquifer is isotropic and homogeneous, draw a sketch (on the diagram) of the region of the aquifer which might be impacted by that contamination.
    c. Under the assumptions given above, where are the likely recharge and discharge areas for this aquifer system?
    d. Argue whether it is likely that any portion of the water entering the aquifer in the vicinity of point D will eventually arrive at point C.



3. Wells are located at locations (x,y)=(0,0), (5,15) and (10,10) and the respective head at each well is 80,90 and 100. All units are in meters. Using the graphical three-point method, calculate the direction of flow and the hydraulic gradient.