



Explain your answers with neat sketches whenever possible. Assume any missing data.

Assignment 6 – Height Systems

1. The ellipsoidal height of a geodetic marker at station A is 156.098 m and at station B is 212.087 m. If the geoidal heights are 4.016 m, and 5.981 m, respectively. Compute the orthometric height difference between A and B.
2. Geodetic markers at stations G and H have ellipsoidal heights of 302.145 m and 278.983 m, respectively. Their corresponding geoidal heights are 8.271 m and 9.543 m. Calculate the orthometric height difference between stations G and H.
3. Imagine you're working on a surveying project that requires determining the elevation difference between two points with known ellipsoidal heights. However, you only have access to a regional geoid model with a certain level of accuracy. Discuss the steps involved in calculating the orthometric height difference between these points, considering potential limitations and error sources associated with the chosen geoid model.
4. Gravity measurements are provided at a geodetic marker J such that geopotential number (C) = 6,278,432 kgm^2/s^2 and geopotential number (C): 6,278,432 kgm^2/s^2 . Calculate the normal height (H^*) for this marker.
5. Given that the geopotential number at a point (C) = 6,275,432 kgm^2/s^2 . Also, Geopotential number at a point (C) = 6,275,432 kgm^2/s^2 and normal gravity model 2 (γ_{model2}) = 9.80357 m/s^2 . Calculate the normal height (H^*) for the point using both gravity models and compare the results.
6. Given the geopotential number (C) = 6,282,143 kgm^2/s^2 at station M. Also, the reference normal gravity at 45 degrees (γ^* at 45°) = 9.80399 m/s^2 . Calculate the dynamic height at the station.
7. Comment on the following statements: -
 - a. Orthometric heights differ for points on the same level surface.
 - b. Geopotential number is constant for the geopotential (level) surface.
 - c. Geopotential numbers can be used to define height and are considered a natural measure for height.
 - d. Gravity observations are essential with spirit leveling in large scales.
 - e. The methods to determine the orthometric height.