Explain your answers with neat sketches when applicable. Assume all computations are made on Helmert1906 (a = 6378.2 km, $f = \frac{1}{298.3}$). Also, mean radius of the earth is R = 6371 km.

Assignment (1) – A geodetic Review

1. Given the following information, calculate the length on a meridian between two points:
   - Latitude of Point A (φ_A) = 40.7128 degrees
   - Latitude of Point B (φ_B) = 34.0522 degrees
2. Calculate the length on a parallel between two points using the formula for length on parallels:
   - Latitude of the points (φ) = 60 degrees
   - Longitude of Point A (λA) = -75 degrees
   - Longitude of Point B (λB) = -80 degrees
3. Compare the lengths on meridians between two pairs of points, considering their latitudes:
   - Latitude of Point A1 (φ_{A1}) = 0 degrees
   - Latitude of Point B1 (φ_{B1}) = 30 degrees
   - Latitude of Point A2 (φ_{A2}) = 10 degrees
   - Latitude of Point B2 (φ_{B2}) = 50 degrees
4. Compare the lengths on parallels between two pairs of points, considering their longitudes:
   - Latitude of the points (φ) = 45 degrees
   - Longitude of Point A1 (λ_A1) = -100 degrees
   - Longitude of Point B1 (λ_B1) = -80 degrees
   - Longitude of Point A2 (λ_A2) = -110 degrees
   - Longitude of Point B2 (λ_B2) = -90 degrees
5. Compare the length on a meridian and the length on a parallel between two points:
   - Latitude of the two points (φ) = 20 degrees
   - Longitude of Point A (λ_A) = -60 degrees
   - Longitude of Point B (λ_B) = -80 degrees
6. Given the following measurements of a spherical triangle:
   - Angle α = 45° 15' 30"
   - Side b = 16 km
   - Angle ß = 30° 45' 15"
   Calculate the spherical excess of the triangle.
7. Given the following measurements of a spherical triangle:

   - Side a = 9 km
   - Angle α = 50° 30' 20"
   - Angle ß = 70° 15' 45"
   - Calculate the spherical excess of the triangle.