Homework 9

(Total 20 pts; Due Dec. 8 12pm)

Question 1. (5 pts) *Use the Gauss-Bonnet Theorem to prove that circles on the unit sphere that are not big circles are not geodesics.*

Question 2. (5 pts) *Let $S_A, ..., S_Z$ be compact surfaces that look like $A, B, ..., Z$ respectively. How many values do the 26 integrals of Gaussian curvatures $\int_{S_A} K, ..., \int_{S_Z} K$ take?*

Question 3. (10 pts) *Prove that geodesic curvature is invariant under isometries. (Hint: Show that if $\gamma(s) = \sigma(u(s), v(s))$ then κ_g can be calculated using u, v and the Christoffel symbols.)*