General Relativity HW 6 Quiz Name_____

You know the drill!

1. For a 2-sphere with coordinates (θ, ϕ), write down the equations for parallel transport of a vector along a line of constant **longitude.** Then parallel transport the vector with initial components $V^{\mu} = (1,0)$ once around the line and write down the result. You may use any results from your homework without deriving them again. The differential equations you will need to solve should be as easy or easier than those from your HW.

Turn over for second question.

2. Consider the upper-half plane model of the hyperbolic plane $H = \{(x, y) \in \mathbb{R}^2 | y > 0\}$ with line element $ds^2 = \frac{dx^2+dy^2}{y^2}$. Find the form of the divergence operator on a vector function $\mathrm{V}^{\mu}(x, y)$ in the coordinate basis.