1. A bike rider riding a bike on a hill road, if the equation of the path is 5

$$y = \ln\left(\cot\left(\sin\left(\sin^{-1}\left(\ln\left(\sqrt{\frac{1+x}{1-x}}\right)\right)\right)\right)\right)$$ then find the slope of the path at x=0.5.

2. Evaluate $\frac{dy}{dx}$: 5

$$y = x^{x^x}$$

3. If $y = x.\tan x.a^x$ and $z = \tan^{-1}\left(\frac{\cos 2x}{1+\sin 2x}\right)$, then find $\frac{dz}{dy}$. 5