6. (15 points) The metric in Anti de Sitter space can be written as:

$$ds^2 = -c^2\left(1+\frac{\Lambda}{3}R^2\right)dt^2 + \left(1+\frac{\Lambda}{3}R^2\right)^{-1}dR^2 + R^2\left(d\theta^2+\sin^2\theta d\phi^2\right) \qquad (1)$$

(a) Find the time it takes a radially directed light to travel from $R = 0$ to $R = \infty$. [**Hint: The following integral may be useful:** $\int(1+x^2)^{-1}dx = \arctan x$]

(b) A bubble of vanishing size forms at $\{t = 0, R = 0\}$ in Anti de Sitter space. Assuming that the bubble is spherically symmetric and expands at the speed of light, what is the surface area of the bubble as a function of time? Is the surface area larger or smaller than it would have been in flat space?