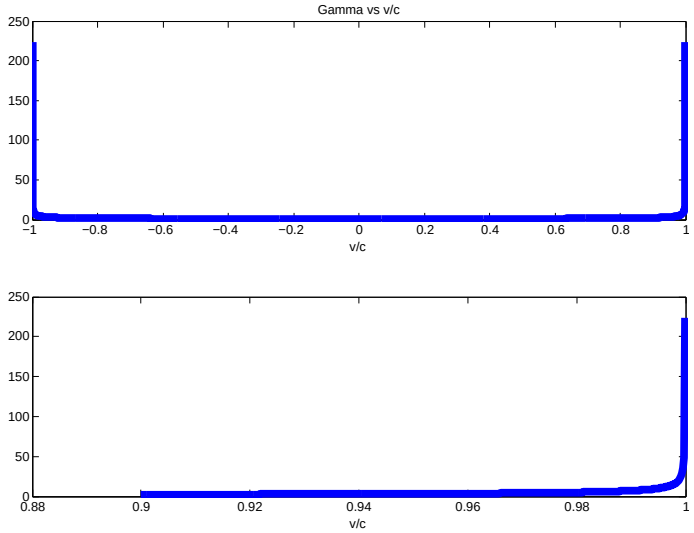
HW1 Solutions

1. (a) $\gamma = \frac{1}{\sqrt{1-(v^2/c^2)}}$ is plotted in the figure below



(b) $\left(\frac{99.9Km}{\text{hour}}\right)\left(\frac{1hr}{3600\text{s}}\right)\left(\frac{1000m}{1\text{km}}\right) = 2.77m/s$ and so $v/c \approx 10^{-8}$ and $\gamma \approx 1.000000000000000005$. From the clerk's point of view you are 10 Km away traveling at 99.9 km/hour, so the total trip time (as seen by the clerk) is about 6 minutes. Your clocks duration will be $\frac{6}{\gamma}$ minutes, and so your clock is slow by $\frac{6}{\gamma} - 6 \approx 0$ minutes.

(c) Now the speed of light is 100 km/hour and so $\gamma \approx 22$, so your watch is slow by $\frac{6}{\gamma} - 6 \approx -5.7$ minutes.

2. Simply travel in a train or car at speeds close to 100 km/hour, within a few minutes (according to your watch) it will be Friday. Unfortunately there is no way to come back to Wednesday (no backwards in time travel).