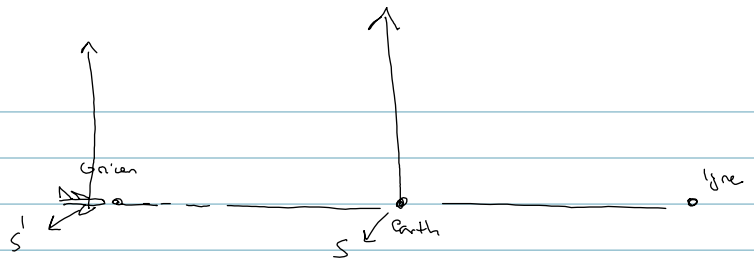

let "earth" be the IRF S and the craft be IRF S'

WRT S:

$\Delta t = 0$ seconds

$\Delta x = 5$ lightyears $= 4.7305\ E16$ meters

WRT S':

$\Delta t' = ? = \gamma\left[\Delta t + \frac{\Delta x v}{c^2}\right] = \gamma\left[\frac{\Delta x v}{c^2}\right]$ (1)

$\Delta x' = \gamma\left[\Delta x - v\Delta t\right] = \gamma\left[\Delta x\right]$ (2)

First, lets calculate $\gamma := \left(\sqrt{1-\beta^2}\right)^{-1} \ldots = 0.\overline{99}$

(2) $\Rightarrow \Delta x' \approx 4.73049\ E16$

(1) $\Rightarrow \Delta t' \approx 0.99\,(4.73049\ E16)(277)(3\ E{-}8)^2 \approx 11776.9$ seconds

So the answer to (a) = 11776.9 s

b) $t_1' = \gamma\left[t_1 \mp x_1 \frac{v}{c^2}\right] \rightarrow t_1' = t_1 + K$ (look at the figure; $x_1, \frac{v}{c^2}$)

$t_2' = \gamma\left[t_1 - x_1 \frac{v}{c^2}\right] \rightarrow t_2' = t_1 - K$

t_1 and t_1 are the same

Event lyre comes first

b) $\Rightarrow$ lyre