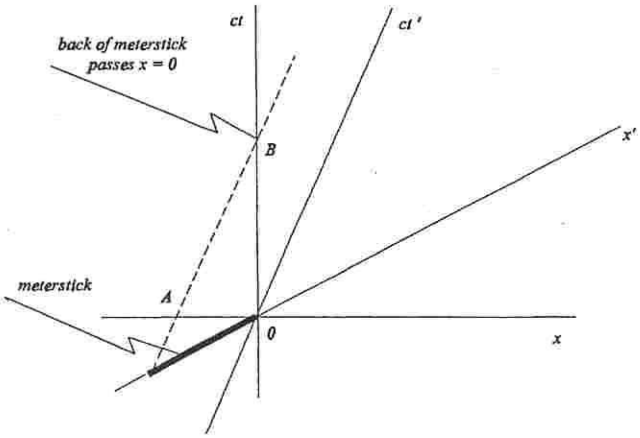
$$= L_p\sqrt{1 - v^2/c^2} = 1.0m\left[1 - (0.6c)^2/c^2\right]^{½} = 0.80\ m$$

(b) $t = L/v = 0.80m/0.6c = 4.4\times10^{-9}s$

(c)



The projection $\overline{OA}$ on the x axis is L. The length $\overline{OB}$ on the ct axis yields t.

1-24. (a)

$$\Delta t = \gamma\,\Delta t' = \frac{\Delta t'}{\sqrt{1-v^2/c^2}} \quad \text{(Equation 1-28)}$$

$$= \frac{2.6\times10^{-8}s}{\left[1-(0.9c)^2/c^2\right]^{½}} = \frac{2.6\times10^{-8}s}{\sqrt{0.19}} = 5.96\times10^{-8}\ s$$

(b) $s = v\Delta t = (0.9)(3.0\times10^{8}m/s)(6.0\times10^{-8}s) = 16.1\ m$

(c) $s = v\Delta t = (0.9)(3.0\times10^{8}m/s)(2.6\times10^{-8}s) = 7.0\ m$

(d) $(\Delta s)^2 = (c\Delta t)^2 - (\Delta x)^2$ (Equation 1-33)

$$= \left[c(6.0\times10^{-8})\right]^2 - (16.1\,m)^2 = 324 - 259 = 65 \quad\rightarrow\quad \Delta s = 7.8m$$

1-26. (a) t = distance to Alpha Centauri/spaceship speed = $4c\cdot y/0.75c = (4/0.75)y = 5.33y$

(b) For a passenger on the spaceship, the distance is:

$$L = L_0\sqrt{1-v^2/c^2} = 4c\cdot y\sqrt{1-(0.75)^2} = 4c\cdot y(0.661)/0.75c = 2.65c\cdot y$$

and $t = 2.65c\cdot y/0.75c = 3.53\ y$