[lex164] Two events, two views, one common ground

Inertial frame $\mathcal{F}'$ is moving with velocity $v = +0.5c$ relative to inertial frame $\mathcal{F}$. Consider the events P at $x = 1.8$m, $ct = 1.4$m and event Q at $x' = 1.0$m, $ct' = 2.0$m.

(a) Draw a Minkowski diagram to scale on graph paper and determine the coordinates of both event in the other frame by graphical construction. You may use a graphics software instead.

(b) From the data thus given or read off the diagram, calculate the spacetime distances $\Delta s \doteq \sqrt{(c\Delta t)^2 - (\Delta x)^2}$ and $\Delta s' \doteq \sqrt{(c\Delta t')^2 - (\Delta x')^2}$ between the two points in the frames S and S', respectively.

Solution: