At time t = 0, Rocket A leaves the Earth with a velocity of $c/2$ in the x-direction and Rocket B leaves the Earth with a velocity of $-2c/3$ in the y-direction. Assume the Earth is an inertial reference frame. Rocket A travels a distance of 6 light years relative to the Earth's frame and then stops. Call the stopping of Rocket A event #1. Rocket B travels a distance of 4 light years relative to the Earth's frame and stops. Call the stopping of Rocket B event #2. Both rockets were traveling with constant velocity before stopping.

(a) Are events #1 and #2 time-like, light-like, or space-like separated? You must explain your answer to receive credit.

(b) An observer in another reference frame measures a time interval between event #2 and event #1 of 3 years. What is the distance (in light years) between the event #1 and #2 according to an observer in this frame?

(c) Consider the time intervals between event #1 and event #2 recorded by all possible inertial observers. There is an inertial frame that gives the minimum time interval. What is this minimum time interval?

(d) There is an inertial frame that gives the minimum spatial separation between event #1 and event #2. What is this minimum spatial separation?

(e) Consider an inertial frame that moves along the direction of the separation between event #1 and event #2 as viewed in the Earth's reference frame. Find the velocity vector (relative to Earth) for the frame that gives the shortest possible distance between event #1 and #2.