



B was travelling at $v = 0.5c$ for t seconds, going through a distance

$D = 0.5c \cdot t$, when A flashed the light

$$x_B = 0.5c(t + t_2)$$

$$x_L = ct_2$$

$$\therefore x_L = 0.5c(t + t_2)$$

$$t_2 = 2t \quad (\text{highlighted in red box})$$

$$\gamma = 2t$$

$$\gamma = \frac{t_3 - 0}{\sqrt{3/2}} \Rightarrow 2t = \frac{2t_3}{\sqrt{3}} \Rightarrow t_3 = \frac{t}{\sqrt{3}} \quad (\text{highlighted in red box})$$

x_B when B flashed the light is therefore

$$x_B = 0.5c \left(t + 2t + \frac{t}{\sqrt{3}} \right)$$

$$\text{The light travels } c \cdot t_4 = 0.5c \left(3t + \frac{t}{\sqrt{3}} \right)$$

$$\therefore t_4 = 0.5 \left(3t + \frac{t}{\sqrt{3}} \right) \quad (\text{highlighted in red box})$$

$$\therefore \text{Total time} = t + 2t + \frac{t}{\sqrt{3}} + \frac{3t}{2} + \frac{t}{2\sqrt{3}} =$$

$$= \frac{6\sqrt{3}t + 2t + 3\sqrt{3}t + t}{2\sqrt{3}} = \frac{9\sqrt{3}t + 3}{2\sqrt{3}} =$$

$$= \frac{9t + \sqrt{3}}{2}$$