$$-0.652c = \frac{v_x + 0.80c}{1 + \frac{0.80c\, v_x}{c^2}}$$

$$-0.652c - 0.5216 v_x = v_x + 0.80c$$

$$-1.452c = v_x(1 + 0.5216)$$

$$\therefore v_x = -0.954c$$

-ve because e^- is moving in -ve x direction.

Hence, time for e^- to reach Earth as measured by observer on Earth is,

$$= \frac{9 \times 10^8 (m)}{0.954 \times 3 \times 10^8 (ms^{-1})} = \underline{\underline{3.14 s}}$$

(d) We know $v_x' = +0.652c$

$$V = (-0.80c)$$

$$\therefore \quad 0.652c = \frac{v_x - (-0.80c)}{1 - \frac{(-0.80c) v_x}{c^2}}$$

ie

$$0.652c = \frac{v_x + 0.80c}{1 + \frac{0.80c\, v_x}{c^2}}$$

$$\therefore \quad v_x = -0.309c$$

So positron is in fact coming down to Earth, but much more slowly than electron

RA Mooney