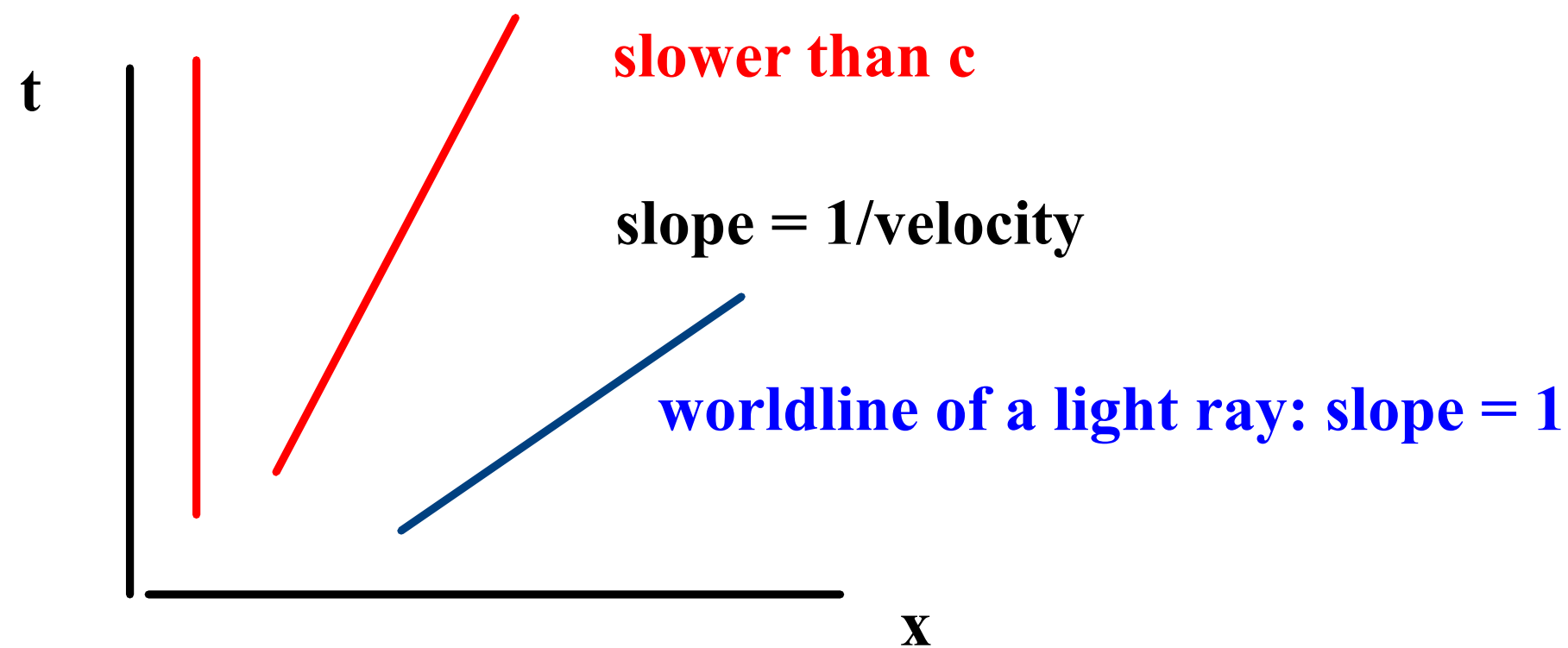


In relativity, it can be useful to use "light-seconds" as our unit of distance. (Or just seconds.)

Speed of light then is $c = (1 \text{ s}) / (1 \text{ s}) = 1$.

If $x=5\text{s}$, how do I calculate this in meters?

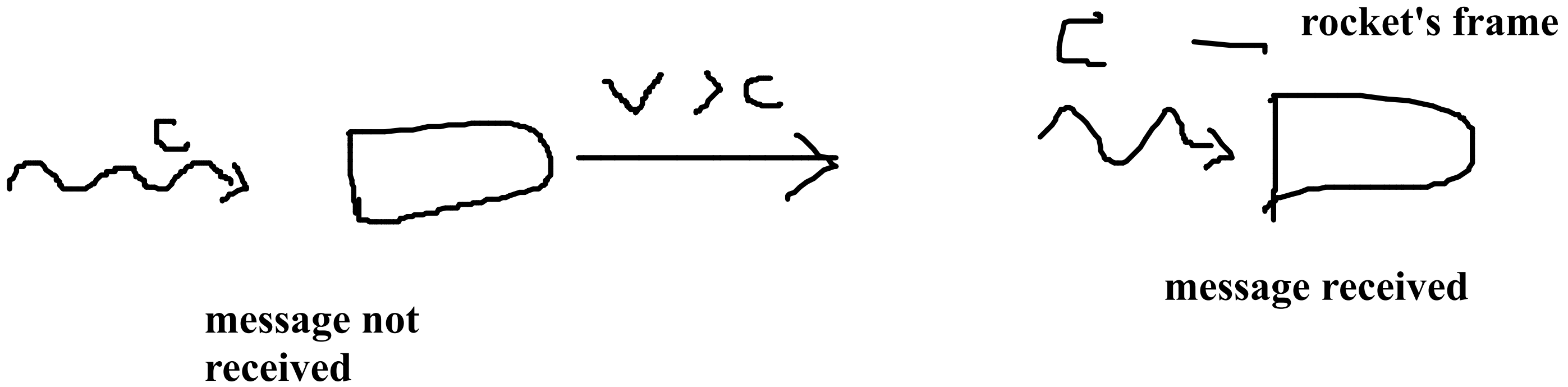
~~(5s)~~ ~~(3e8 m/s)~~ = 15e8 m



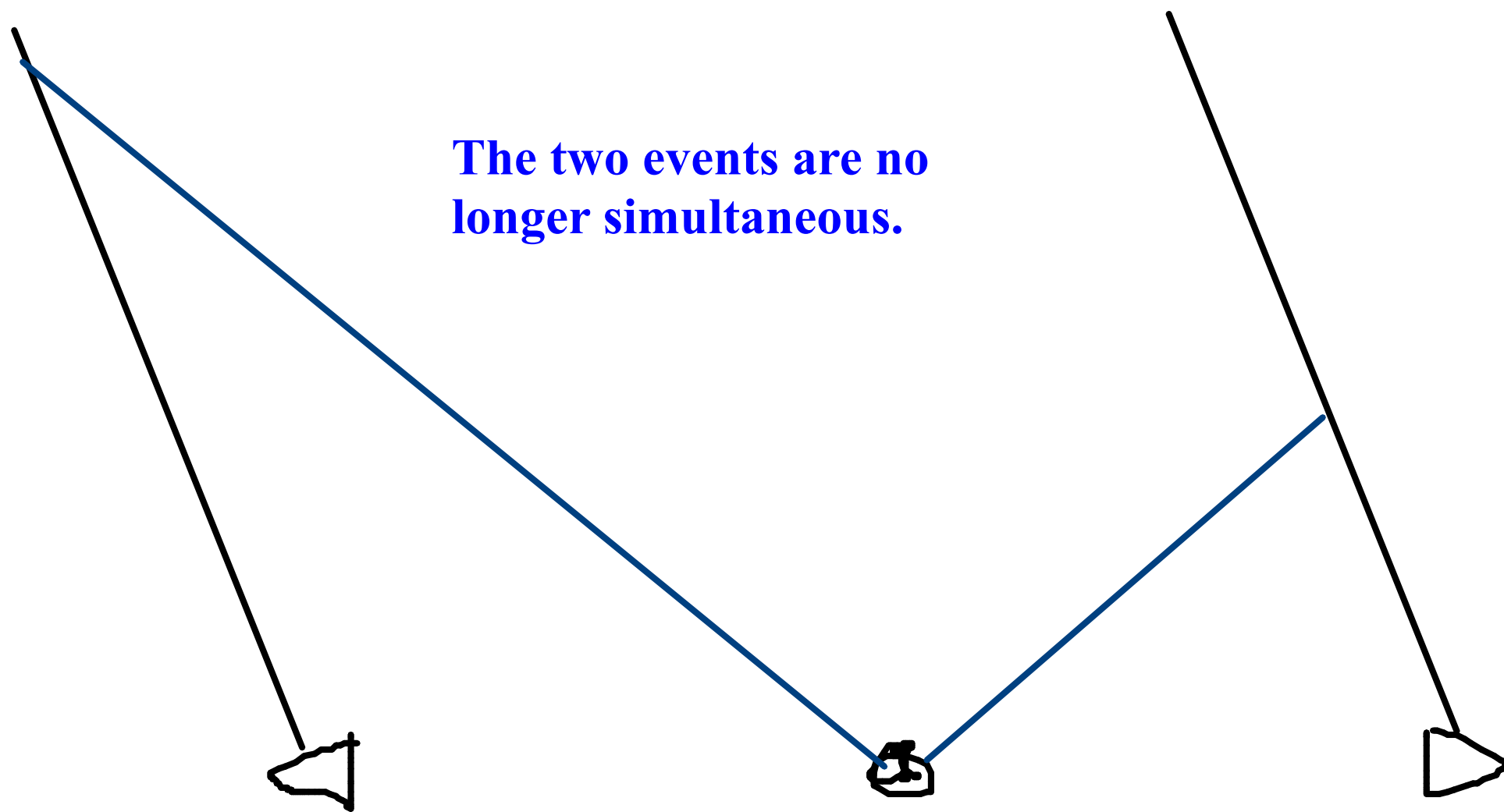
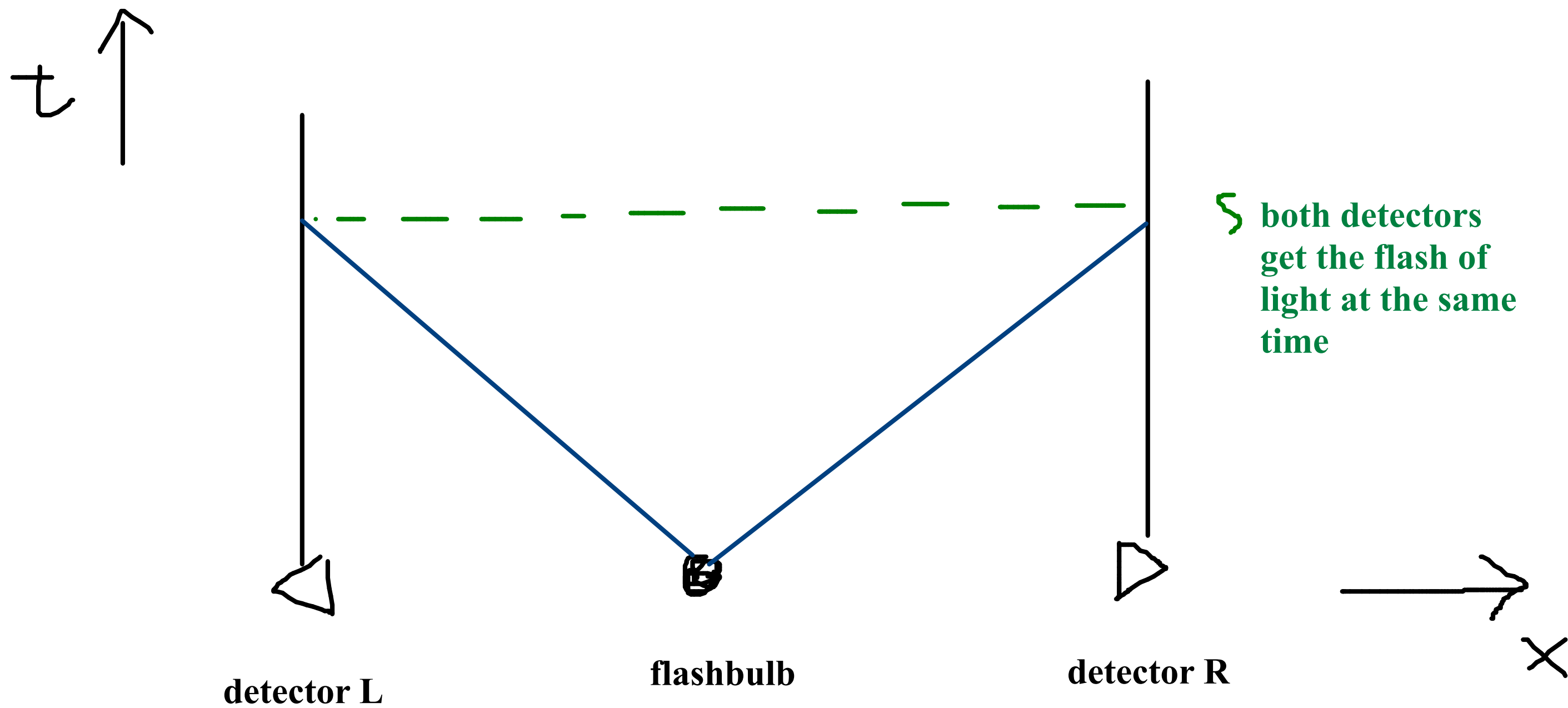
vertical line: stationary

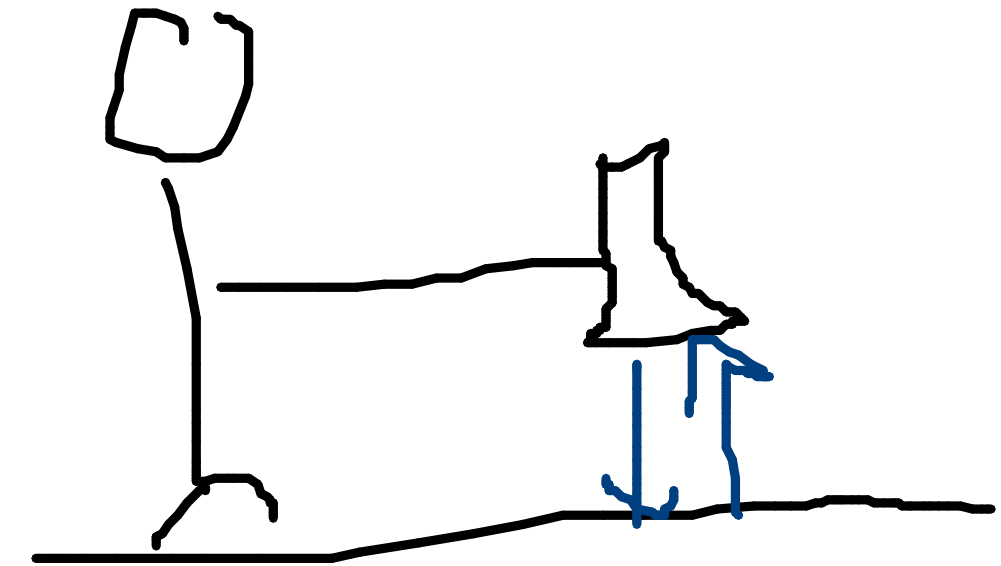
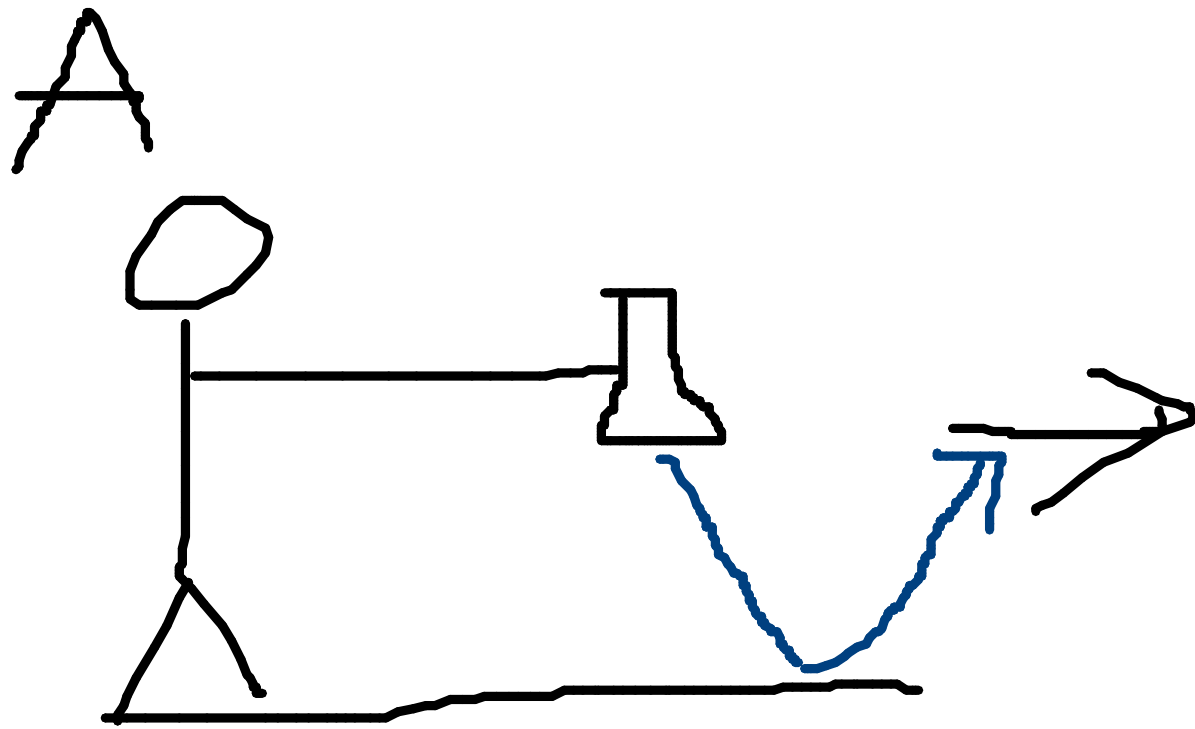
horizontal line: everywhere at once, for one moment

**Objects can't travel faster than light.
Proof:**



CONTRADICTION:
Therefore, impossible to move faster than c .

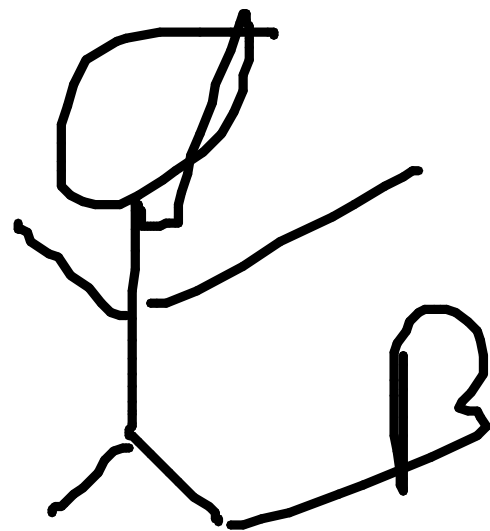




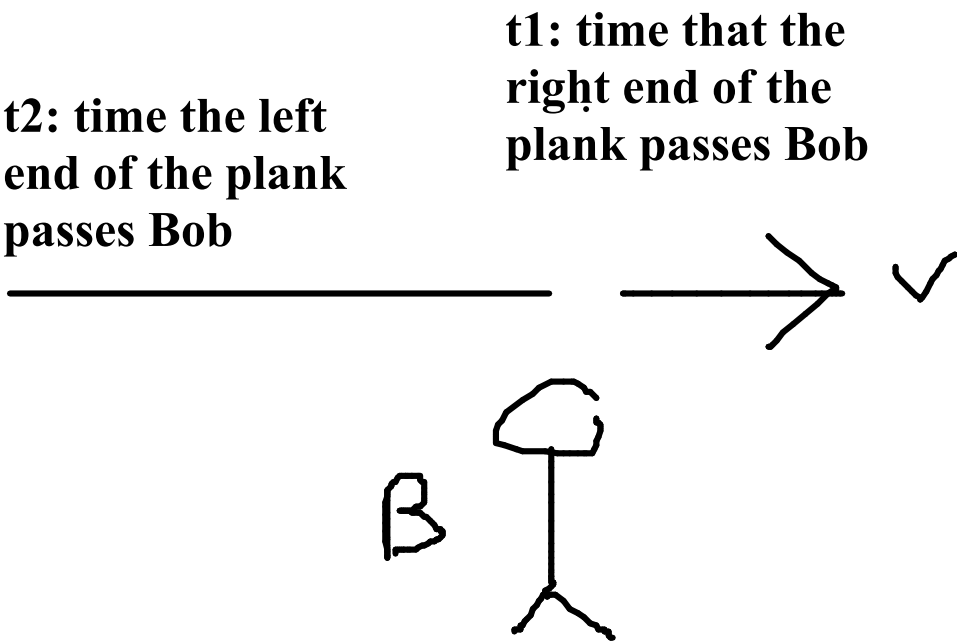
Bob sees the beam travel a greater distance, but move at the same speed

Therefore: Bob sees the light take a longer time to travel than Alice does: the actions in Alice's frame look slowed down to Bob.

TIME DILATION



Bob measures a moving plank



$$L = v(t_2 - t_1)$$

$$L' = v(t_2' - t_1')$$

In plank's frame, t1' is time Bob passes the right end of the plank, and t2' is time Bob passes left end.

Takes less time for plank to pass Bob in Bob's frame, than in the plank's frame: Bob thinks the plank is shorter than the plank thinks it is.

LENGTH CONTRACTION

