

Two major results of special relativity are Time Dilation and Lorentz Contraction. Please pick one of the choices below which best describes how well you feel you understand them.

- A. No idea what these effects are
- B. I remember having heard about these, but couldn't define them precisely right now.
- C. I know what these effects are, (but I've forgotten how to derive them)
- D. I know what these effects are, and I even sort of remember the derivation, but it would take me a while to sort it out
- E. I'm confident I could derive these results right now

You are standing next to a conveyer belt that is transporting a baby (don't ask questions) at **1 m/s to the right**. The baby is crawling at **2 m/s to the right**. What is the velocity of the baby in your frame?

- A. 1 m/s to the left
- B. 1 m/s to the right
- C. 3 m/s to the right
- D. 3 m/s to the left
- E. Something else

ANNOUNCEMENTS

- Quiz 6 (Next Friday)
 - Given two infinite plane waves at different frequencies, determine the resulting wave in a "good conductor"
 - Sketch the waves in free space and in the conductor
 - Discuss the implications from your analysis
- Poster rubric will be posted this week

You are standing next to a conveyer belt that is transporting a baby (don't ask questions) at **1 m/s to the right**. The baby is crawling at **2 m/s to the left**. What is the velocity of the baby in your frame?

- A. 1 m/s to the left
- B. 1 m/s to the right
- C. 3 m/s to the right
- D. 3 m/s to the left
- E. Something else

DEMO

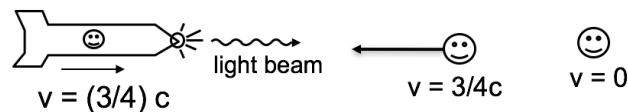
Galilean relativity example courtesy of Jamiroquai

Standing on a moving walkway in the airport that is moving at 1 m/s to the right, you toss a ball into the air. You observe the ball moving straight up and down.

I'm sitting on a bench watching your shenanigans. What do I have to do to make my physics match yours? That is, what do I have to do to reproduce all your measurements?

- A. Add 1 m/s to the left
- B. Add 1 m/s to the right
- C. Subtract 1 m/s to the right
- D. Subtract 1 m/s to the left
- E. None or more than one of these

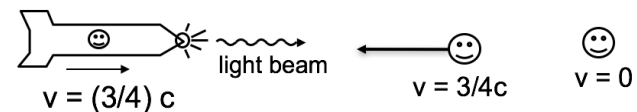
A rocket is moving to the right at speed $v = (3/4)c$, relative to Earth. On the front of the rocket is a headlight which emits a flash of light.



In the reference frame of a passenger on the rocket, the speed of the light flash is

- A. c
- B. $7/4 c$
- C. $1/4 c$
- D. None of these

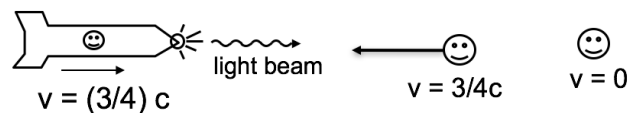
A rocket is moving to the right at speed $v = (3/4)c$, relative to Earth. On the front of the rocket is a headlight which emits a flash of light.



According to a person at rest on the earth, the speed of the light flash is

- A. c
- B. $7/4 c$
- C. $1/4 c$
- D. None of these

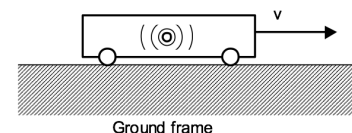
A rocket is moving to the right at speed $v = (3/4)c$, relative to Earth. On the front of the rocket is a headlight which emits a flash of light.



According to a person moving toward the rocket at speed $(3/4)c$, relative to earth, the speed of the light flash is

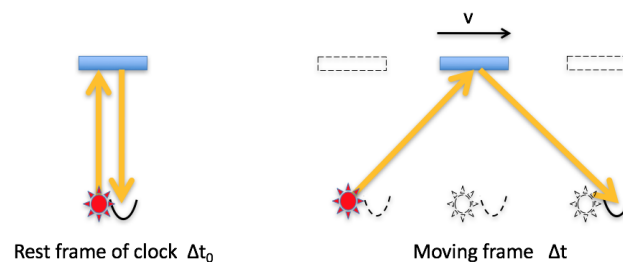
- A. c
- B. $7/4 c$
- C. $1/4 c$
- D. None of these

- A. before
- B. after
- C. at the same time as



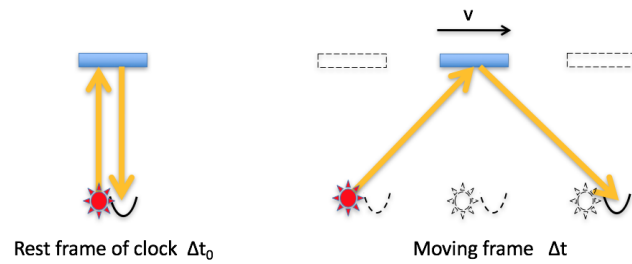
A light bulb flashes in the center of a train car that is moving at speed v with respect to the ground. In the frame of reference of the train car, light wave from the flash strikes the front and back of the train simultaneously.

In the frame of reference of the ground, the light strikes the back of the train **(fill in the blank)** the light strikes the front of the train.



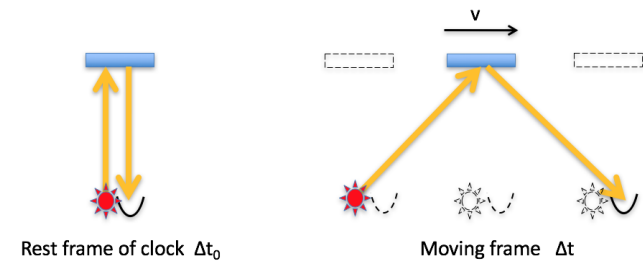
In which frame of reference is the time between tics of the clock **longer**?

- A. Rest frame of clock
- B. moving frame
- C. no difference



What is the **minimum** number of observers needed in the **rest frame** to measure the "tic"?

- A. 1
- B. 2
- C. 3
- D. More than 3
- E. ???



What is the **minimum** number of observers needed in the **moving frame** to measure the "tic"?

- A. 1
- B. 2
- C. 3
- D. More than 3
- E. ???