

# Question 1

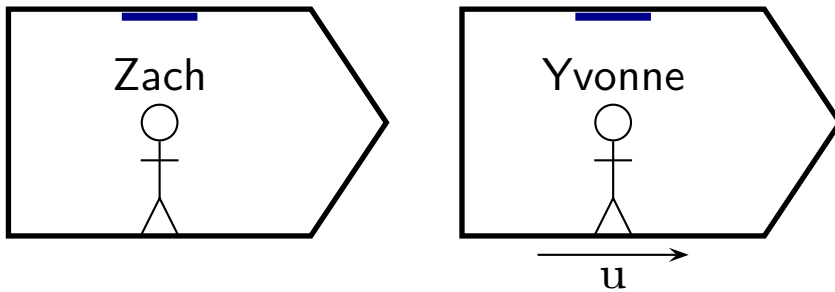
A neutral pion moves toward Yvonne, with speed  $v$  as measured in Yvonne's rest frame. The pion decays into two pulses of light, one of which travels directly toward Yvonne.

Which of the following is true for the speed of the pulse?

1. Galilean relativity  $\Rightarrow v$   
Einstein's postulate  $\Rightarrow c$
2. Galilean relativity  $\Rightarrow v + c$   
Einstein's postulate  $\Rightarrow c$
3. Galilean relativity  $\Rightarrow v - c$   
Einstein's postulate  $\Rightarrow c$
4. Galilean relativity  $\Rightarrow c$   
Einstein's postulate  $\Rightarrow c$
5. Galilean relativity  $\Rightarrow v + c$   
Einstein's postulate  $\Rightarrow v + c$

## Question 2

Two observers Zach and Yvonne travel in rocket ships. The velocity of Yvonne relative to Zach is  $u$ .

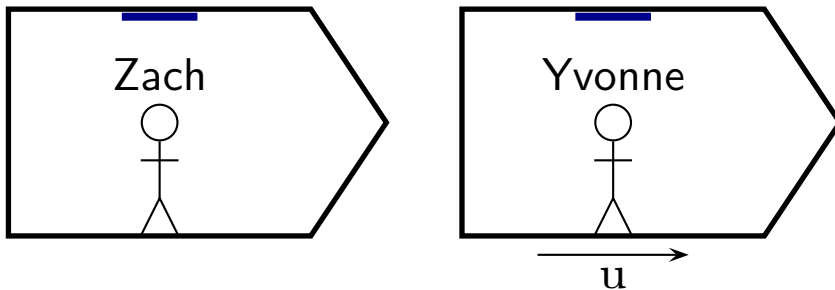


Zach repeatedly fires pulses of light up to his mirror. He records a round trip time for each pulse  $\Delta t_Z$  and Yvonne records  $\Delta t_Y$ . Which of the following is true?

1.  $\Delta t_Z = \Delta t_Y$
2.  $\Delta t_Z < \Delta t_Y$
3.  $\Delta t_Z > \Delta t_Y$

## Question 3

Two observers Zach and Yvonne travel in rocket ships. The velocity of Yvonne relative to Zach is  $u$ .



Yvonne repeatedly fires pulses to the mirror. She records an elapsed round trip time for a pulse time,  $\Delta t_Y$  and for this process Zach records an elapsed time,  $\Delta t_Z$ . Which of the following is true?

1. As Yvonne gets further away both  $\Delta t_Z$  and  $\Delta t_Y$  stay the same.
2. As Yvonne gets further away  $\Delta t_Z$  decreases but  $\Delta t_Y$  stays the same, since it takes longer for the light to reach Zach.
3. As Yvonne gets further away  $\Delta t_Z$  increases but  $\Delta t_Y$  stays the same, since it takes longer for the light to reach Zach.