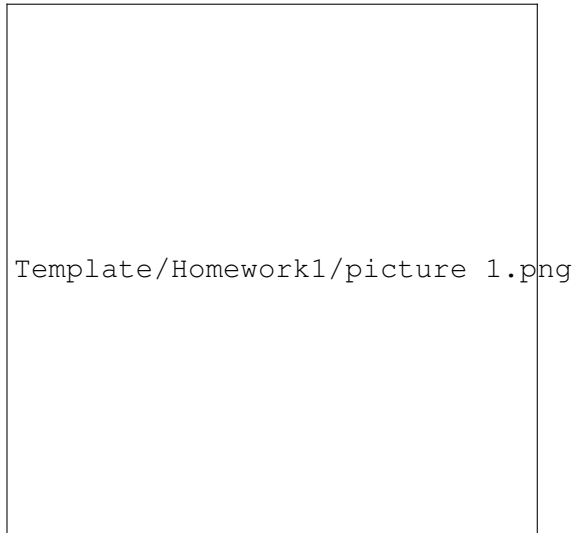


# PHSX 343: Assignment 1

William Jardee

## Problem 1



$$\Delta x = (55m/s)(15s) = (825m)$$

$$S = 1km$$

$$S' = 1km - 0.825km = 0.175km.$$

We are in the non-relativistic realm, so the time doesn't fluctuate. So for both frames  $t = 15s$ .

## Problem 2

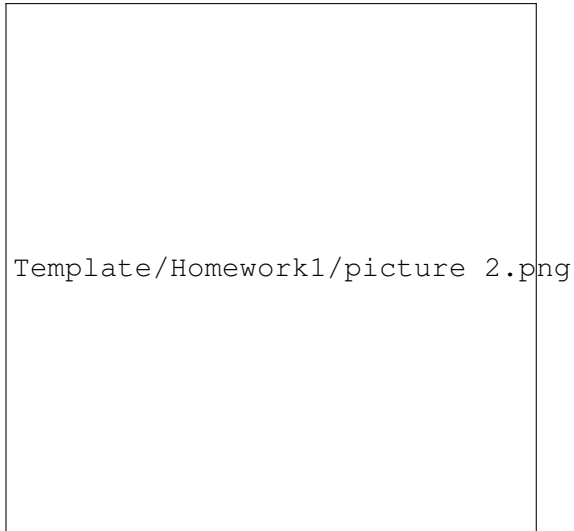
$$V_A = -0.6c \text{ and } V_B = 0.9c$$

$$\text{In the reference frame of B: } V'_A = V_A - V_B = -1.5c$$

$$\text{In the reference frame of A: } V'_B = V_B - V_A = 1.5c$$

$$V'_B = -V'_A = 1.5c$$

The speed of the two particles are the same, but the direction are opposite.



### Problem 3

#### Problem 1(a)

$P_{tot,i} = (0.750kg)(10m/s) + 0$  and  $P_{tot,f} = 0 + (0.750kg)(10m/s)$   
 $P_{tot,i} = P_{tot,f}$ , so total momentum is conserved in the boat's frame.

#### Problem 1(b)

If we name the puck initially moving as A and the other puck B:

Before the collision:  $V_A = 7m/s$  and  $V_B = 17m/s$

After the collision:  $V_A = 17m/s$  and  $V_B = 7m/s$

$P_{tot,i} = (0.750kg)(17m/s) + (0.750kg)(7m/s)$  and  $P_{tot,f} = (0.750kg)(7m/s) + (0.750kg)(17m/s)$

$P_{tot,i} = P_{tot,f}$ , so total momentum is conserved in the boat's frame.