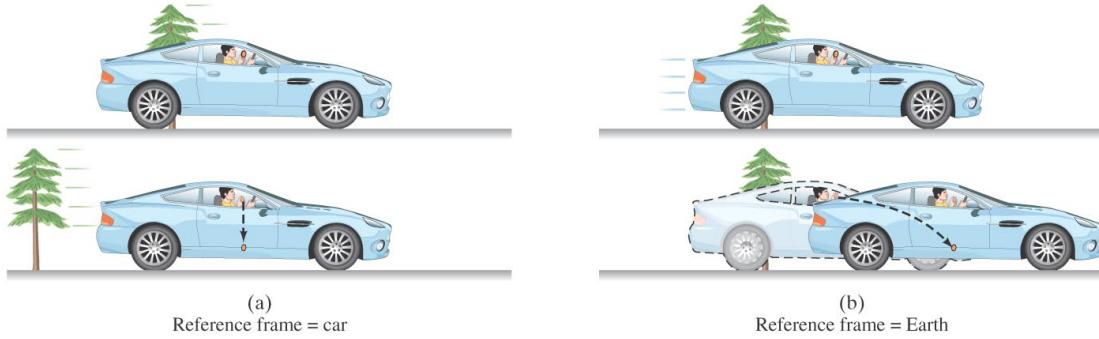


## General Physics II: Tutorial Material 1

1) Obtain the trajectory of the object with a mass  $m$ , for the two cases. The car is moving with a constant speed of  $v$ .



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2) Does the Earth really go around the Sun? Or is it also valid to say that the Sun goes around the Earth? Are the both description equivalent?

3) You are standing inside of a lift in a building with a metal ball in your hand. You drop the ball and at the exactly same time the cable of the lift is cut and the lift starts to fall:  
A) what do you see for the movement of the ball?  
B) what does a person standing on of the floors of the building see?

4) Using the Taylor expansion, demonstrate that the first order approximation in  $x$  is valid for  $F(x) = (1 - x)/(1 + x)$  and  $F(x) = 1/\sqrt{1 - x^2}$  if  $|x| \ll 1$ .

5) Reference frame S' moves at speed  $v = 0.92c$  in the positive  $x$  direction with respect to the reference frame S. The origins of S and S' overlap at  $t = t' = 0$ . An object is stationary in S' at position  $x' = 100$  m. What is the position of the object in S when the clock in S reads 1.00  $\mu$ s, according to the a) Galilean and b) Lorentz transformation?

6) Two space ships are flying toward Earth on the same path; one with  $0.60c$  and the other  $0.90c$ . What is the relative speed of one vessel as seen by the others?