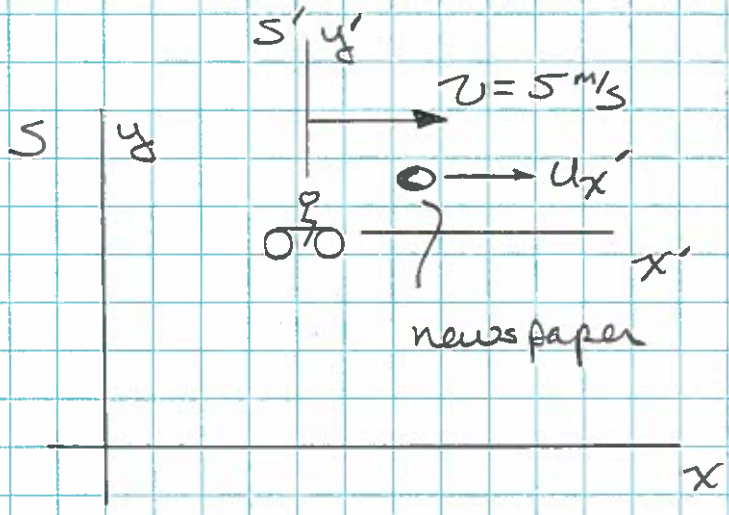

Find speed relative to ground (Galilean Velocity Transformations)

a.) $u_x' = 8\ m/s$, $u_y' = 0$, $u_z' = 0$

$u_x = u_x' + v = 13\ m/s$

$u_y = u_z = 0$ $\therefore$ speed $= 13\ m/s$

b.) $u_x' = -8\ m/s$, $u_y' = u_z' = 0$

$u_x = u_x' + v = -3\ m/s$

$u_y = u_z = 0$ $\therefore$ speed $= 3\ m/s$

c.) $u_x' = 0$, $u_y' = 0$, $u_z' = 8\ m/s$

$u_x = u_x' + v = 5\ m/s$

$u_y = u_y' = 0\ m/s$

$u_z = u_z' = 8\ m/s$

$\therefore$ speed $= \sqrt{u_x^2 + u_z^2} = 9.43\ m/s$