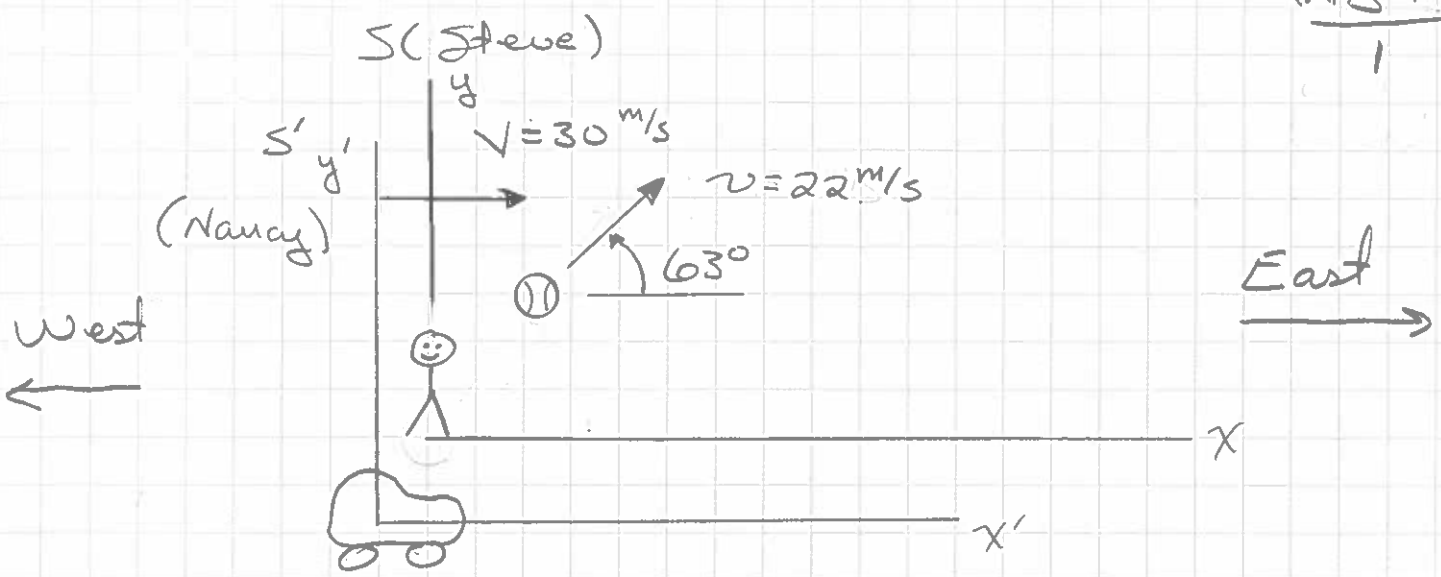


$\vec{v}$ = velocity of ball rel. to S

$\vec{V}$ = " " S' rel. to S

$\vec{v}'$ = " " ball rel. to S'

So:

$$\vec{v} = v_x\hat{i} + v_y\hat{j} = v\cos 63^\circ \hat{i} + v\sin 63^\circ \hat{j}$$

$$\vec{V} = 30\hat{i} \text{ m/s}$$

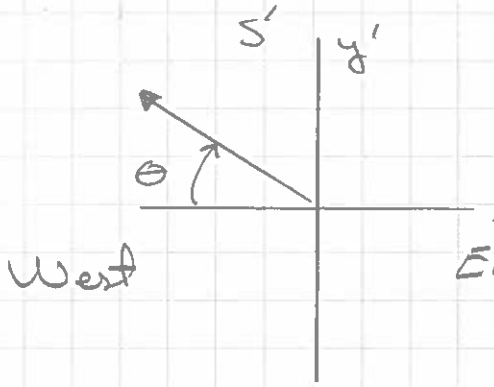
Galilean Velocity Transformation:

$$\vec{v}' = \vec{v} - \vec{V}$$

$$= (v\cos 63^\circ - V)\hat{i} + v\sin 63^\circ \hat{j}$$

So, in S':

$$= -20.01\hat{i} + 19.60\hat{j} \text{ m/s}$$



$$\text{Speed} = \sqrt{v_x'^2 + v_y'^2} = 28.01 \text{ m/s}$$

$$\theta = \tan^{-1}\left(\frac{|v_y'|}{|v_x'|}\right) = 44.41^\circ$$

direction is

West ~45° above ground.