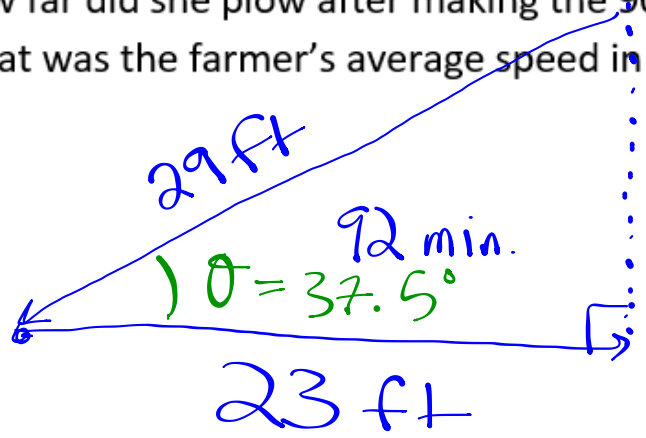
A farmer is plowing her field. She plows 23 feet in a straight line, then turns at a 90° angle and plows some more (again, in a straight line). Finally, she plows back to her starting point (in a straight line, a distance of 29 feet). The total time she spends plowing is 92 minutes.

a) How far did she plow after making the 90° turn?

b) What was the farmer's average speed in meters/day?



$\cos^{-1}\frac{23}{29} = \theta$

$\tan 37.5° = \frac{o}{23}$

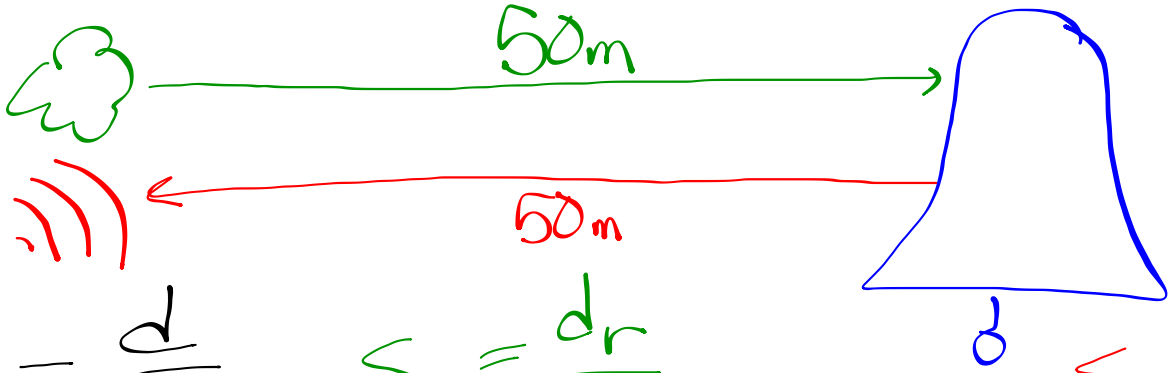
$o = 17.66$ ft (a)

(b) $s = \frac{d}{t} = \frac{29+23+17.66 \text{ ft}}{92 \text{ mins}}$

$s = 0.76 \frac{\text{ft}}{\text{min}} \cdot \frac{1 \text{ m}}{3.29 \text{ ft}} \cdot \frac{60 \text{ min}}{1 \text{ hr}} \cdot \frac{24 \text{ hr}}{\text{day}}$

$s = 331 \text{ m/day}$

8. A rock thrown horizontally at a large bell 50 m away is heard to hit the bell 4.5 s later. If the speed of sound is 330 m/s, what was the speed of the rock? (Disregard the effect of gravity – in other words, ignore any vertical deflection of the rock).



$s = \frac{d}{t}$ $s_r = \frac{d_r}{t_r}$ $s_s = \frac{d_s}{t_s}$

$4.5s = t_r + t_s$

$4.5s = t_r + 0.15s$

$t_r = 4.35s$

$s_r = \frac{50m}{t_r}$

$s_r = \frac{50m}{4.35s}$

$= 11.5 m/s$

$330 \frac{m}{s} = \frac{50m}{t_s}$

$t_s = 0.15s$

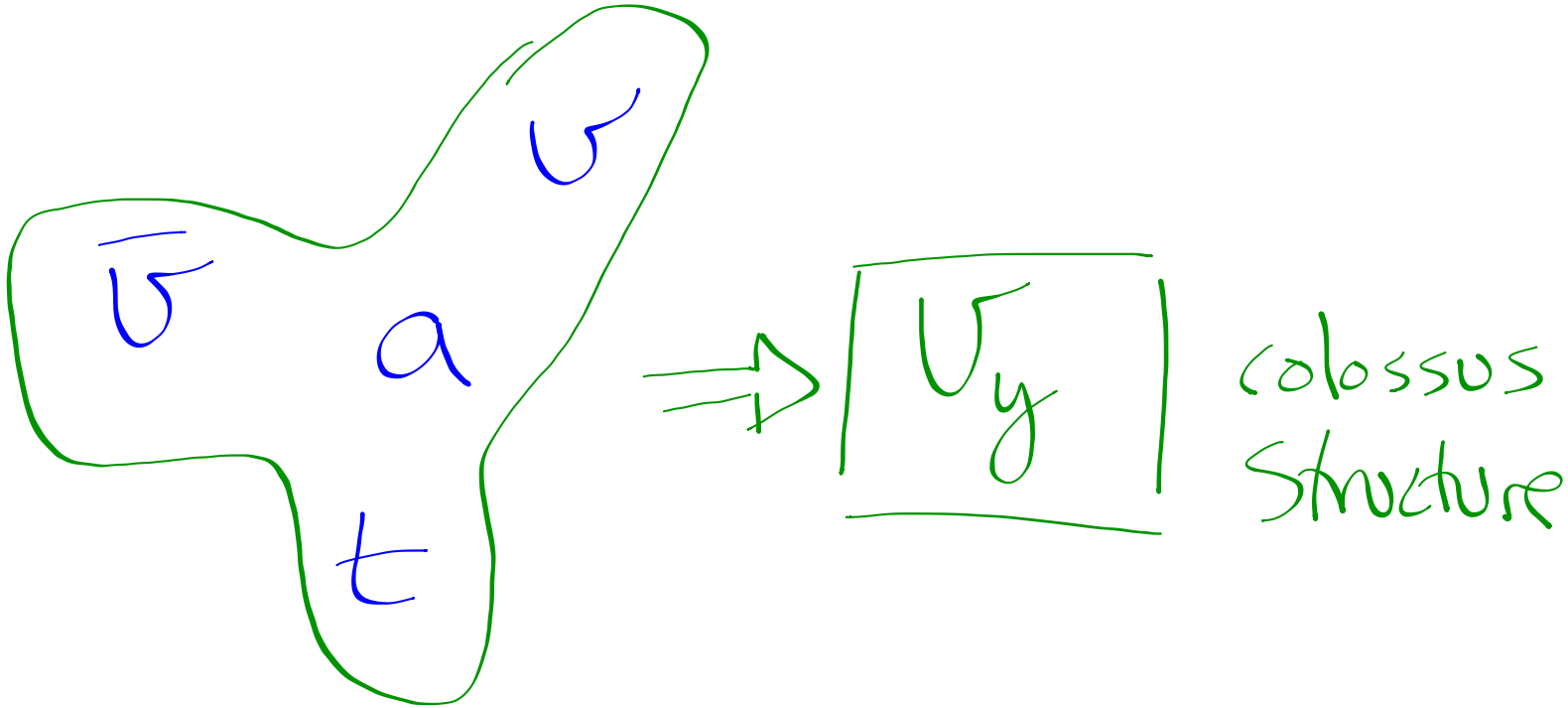
13. At high speeds, a particular automobile is capable of an acceleration of about 0.50 m/s^2 At this rate, how long does it take to accelerate from 90 km/h to 100 km/h?

$$\frac{0.50\ m}{s^2} \cdot \frac{1\ km}{1000\ m} \cdot \frac{3600\ s}{hr} \cdot \frac{3600\ s}{hr} =$$

$$= 6480\ \frac{km}{hr^2}$$

$$\bar{a} = \frac{\Delta v}{\Delta t} \qquad 6480\ \frac{km}{hr^2} = \frac{10\ \frac{km}{hr}}{\Delta t}$$

$$\Delta t = 0.0015\ hr \cdot \frac{3600\ s}{hr} = \boxed{5.56\ s}$$


$\bar{u}$
d
u
t
u_y
colossus
structure