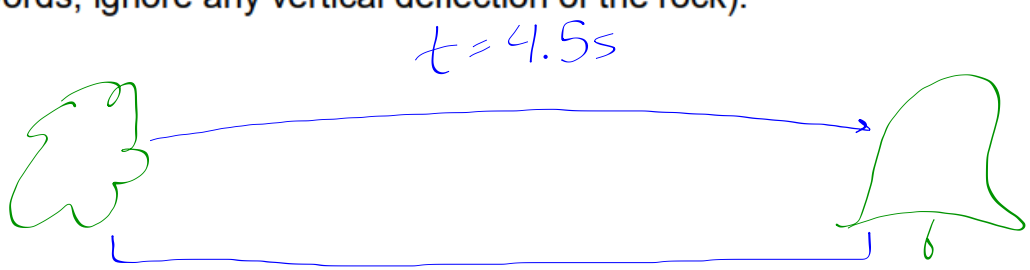
8. A rock thrown horizontally at a large bell 50 m away is heard to hit the bell 4.5 s later. If the speed of sound is 330 m/s, what was the speed of the rock? (Disregard the effect of gravity – in other words, ignore any vertical deflection of the rock).



$t_{total} = t_r + t_s$

$s = \frac{d}{t}$

Rock

$S_r = ?$

$d_r = 50\ m$

$t_r = 4.35\ s$

Sound

$S_s = 330\ m/s$

$d_s = 50\ m$

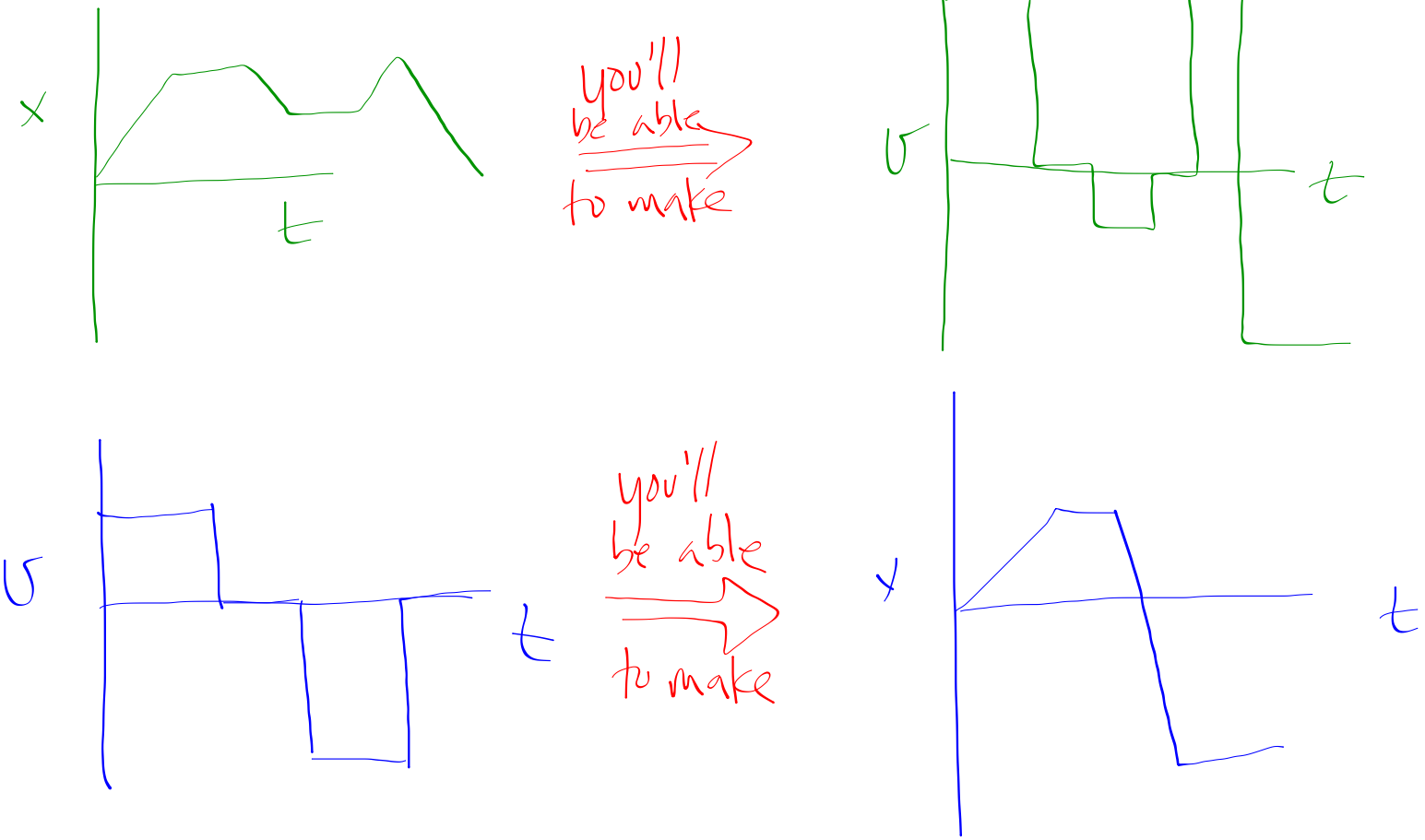
$t_s = 0.15\ s$

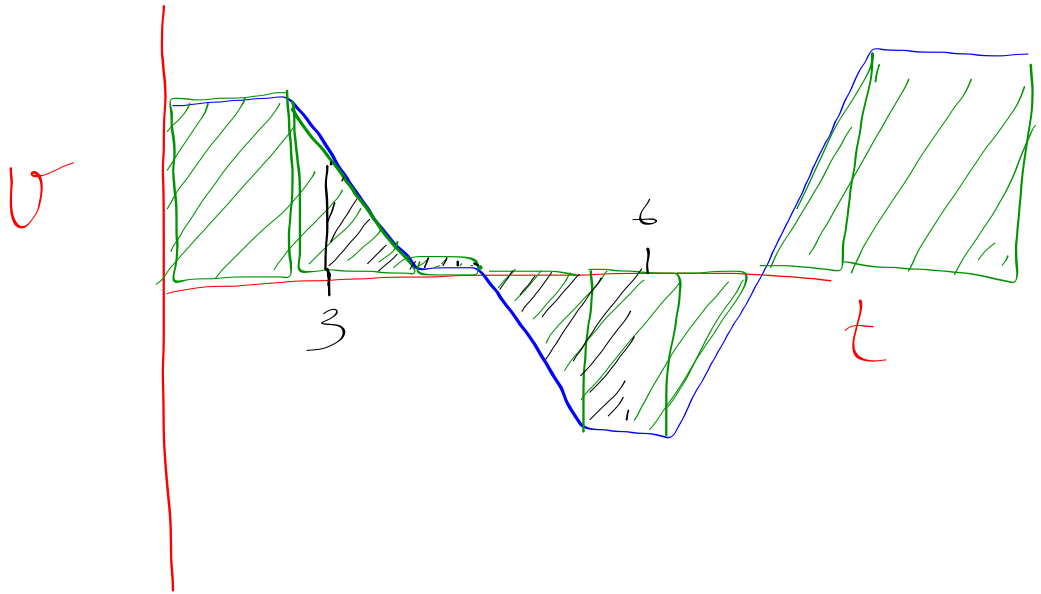
$S_r = \frac{d_r}{t_r} = \frac{50}{4.35} = 11.5\ m/s$

$S_s = \frac{d_s}{t_s}$

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

$t_s = 0.15\ s$


x
t
you'll be able to make
v
t
v
t
you'll be able to make
x
t


v
3
6
t

acceleration:

$$\frac{\text{length}}{\text{time}^2} \Rightarrow \frac{m}{s^2}$$

$$a = \frac{\Delta v}{\Delta t} \Rightarrow \frac{m/s}{s} \rightarrow \frac{m}{s} \div s \rightarrow \frac{m}{s} \cdot \frac{1}{s} = \frac{m}{s^2}$$

$a = 4\ m/s^2$: every second, your velocity will be 4 m/s more positive

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