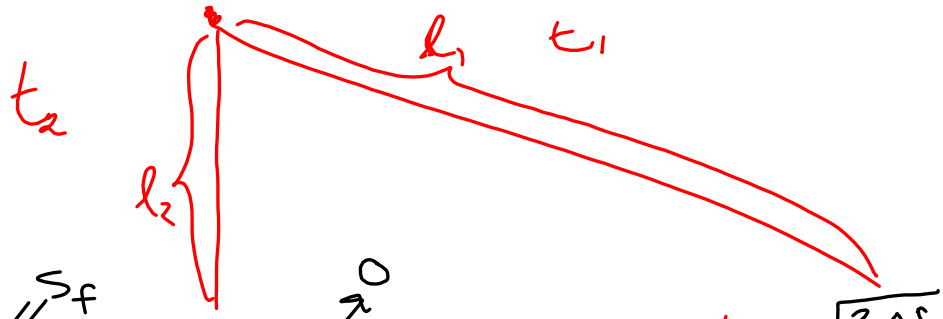
to prove: $\frac{t_1}{t_2} = \frac{l_1}{l_2}$



$s(t) = \frac{1}{2}at^2 + v_0 t + s_0$ (s_f, $v_0 = 0$)

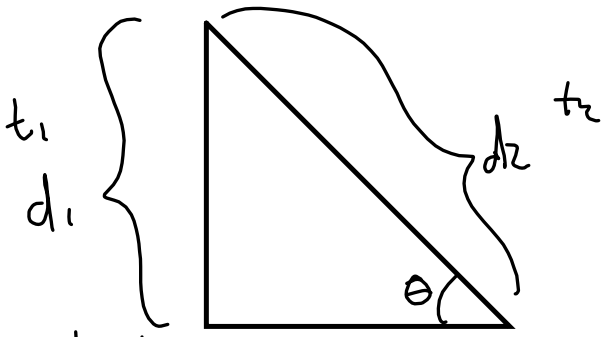
$\underbrace{s_f - s_0}_{\Delta s} = \frac{1}{2}at^2$

$t_1 = \sqrt{\frac{2\Delta s}{a}}$

$t_2 =$

$t_1 = t_2$

$v = at$, $d = \frac{1}{2}at^2$ $v = \frac{d}{t}$



$\frac{t_1}{t_2} = \frac{d_1}{d_2}$

$d_1 = \frac{1}{2}at_1^2$

$t_1 = \sqrt{\frac{2d_1}{a}}$

$\sin\theta = \frac{d_1}{d_2}$

$V_1 = V_2$

$V_2 = at_1$

$d_2 = \frac{d_1}{\sin\theta} = \frac{\frac{1}{2}at_1^2}{\sin\theta}$

$a_2 = a_1\sin\theta$

$d_1 = \frac{1}{2}at_1^2$

$V_1 = at_1$

$d_2 = \frac{1}{2}a\sin\theta\, t_2^2$

$V_2 = a\sin\theta\, t_2$

$d_1 = \frac{1}{2}at_1^2$

$t_1^2 = \frac{2d_1}{a}$

$t_1 = \sqrt{\frac{2d_1}{a}}$

$d_2 = d_1\csc\theta \Rightarrow d_1 = d_2\sin\theta$

$V_2 = a\sqrt{\frac{2d_1}{a}} = \sqrt{2ad_2\sin\theta}$

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to find time @ which

$d_1 = d_2\sin\theta$

$d_1\csc\theta = \frac{1}{2}(a\sin\theta)t_2^2$

$t_2^2 = \frac{2d_1}{a}\csc^2\theta$

$t_2 = \csc\theta\sqrt{\frac{2d_1}{a}}$

$V_2 = kt_2$, $d_2 = \frac{1}{2}kt_2^2$

$V_2 = \sqrt{2kd_2}$, $k = a\sin\theta$

$V_2 = (a\sin\theta)t_2$

$d_2 = \frac{1}{2}(a\sin\theta)t_2^2$