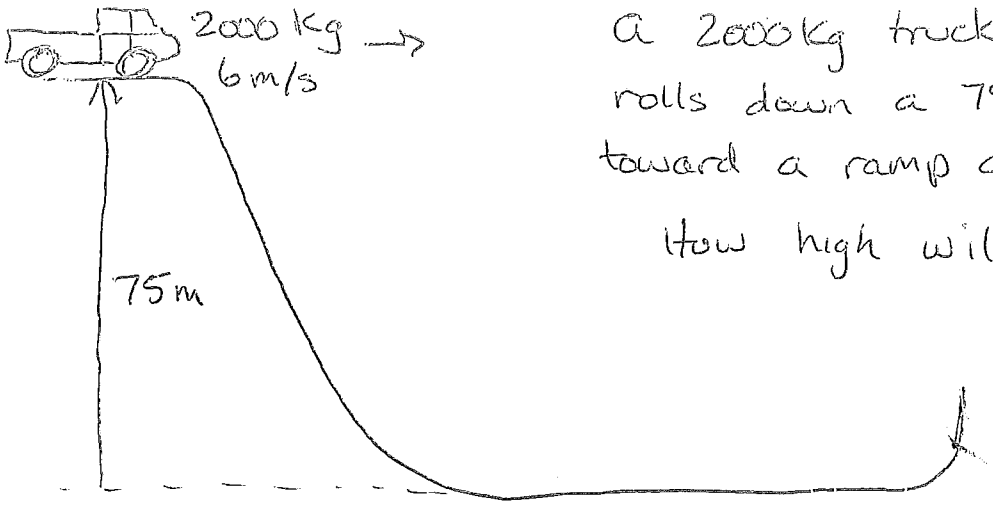
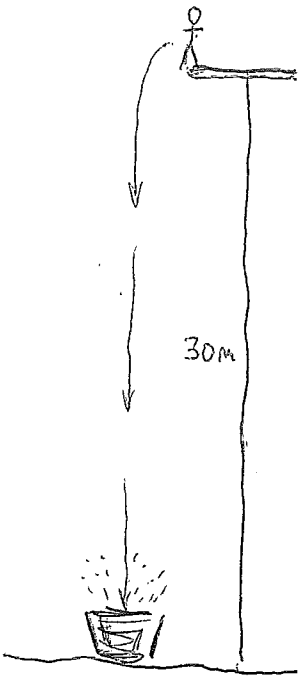
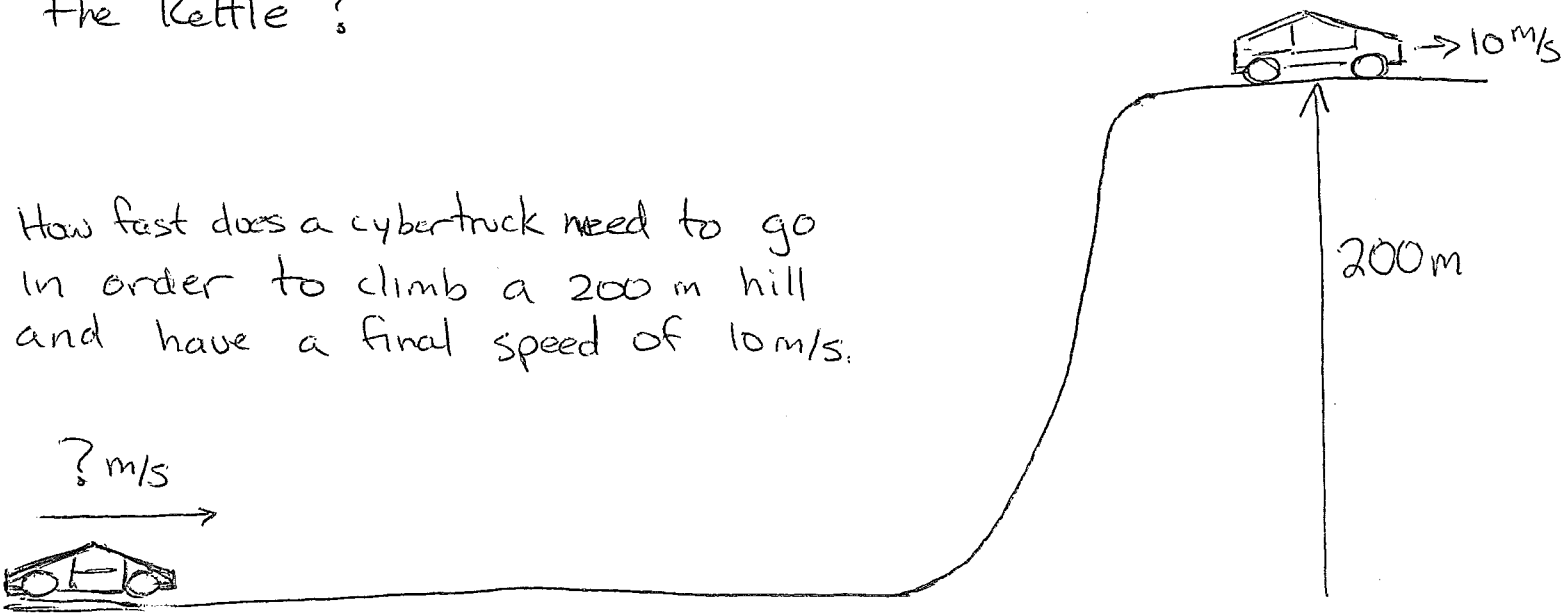


A 2000 kg truck moving at 6 m/s rolls down a 75 m hill. It speeds toward a ramp and launches vertically. How high will it fly?

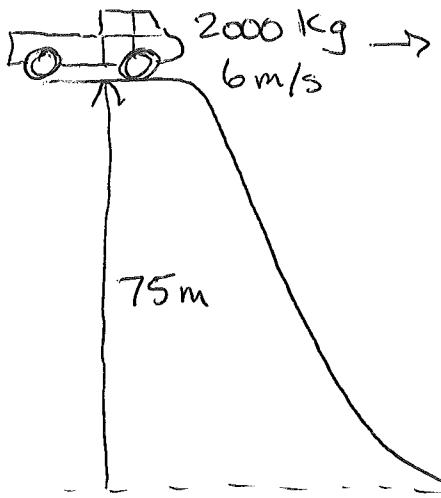


a student dives from a 30 m tower into a large bucket. How fast are they moving at the bottom?

A 1500 w kettle runs for 4 minutes. If the 1.5 kg of water inside goes up by 25°C what is the efficiency of the kettle?



How fast does a cybertruck need to go in order to climb a 200 m hill and have a final speed of 10 m/s.



A 2000kg truck moving at 6m/s rolls down a 75m hill. It speeds toward a ramp and launches vertically. How high will it fly?

$TME = \frac{1}{2}mv^2 + mgh$

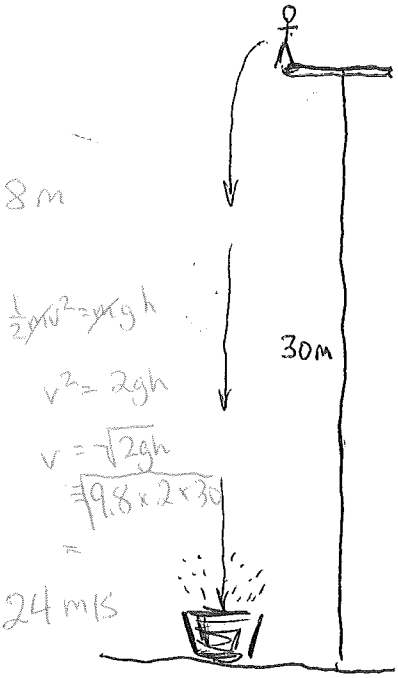
$= \frac{1}{2} 2000 \cdot 6^2 + 2000 \cdot 9.8 \cdot 75$

$= 1{,}506{,}000\ J$

$PE = mgh$

$\frac{PE}{mg} = h$

$\frac{1{,}506{,}000}{(2000 \times 9.8)} = 76.8\ m$



$\frac{1}{2}mv^2 = mgh$

$v^2 = 2gh$

$v = \sqrt{2gh}$

$= \sqrt{9.8 \times 2 \times 30}$

$= 24\ m/s$

a student dives from a 30 m tower into a large bucket. How fast are they moving at the bottom?

$P \times t = w$

$1500w \times s = 360{,}000\ J$

$E_h = mc\Delta T$

$E_h = 1.5 \times 4200 \times 25$

$= 157{,}500$

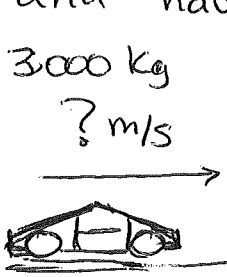
A 1500w kettle runs for 4 minutes. If the 1.5 kg of water inside goes up by 25°C what is the efficiency of the kettle?

$Effic. = \frac{useful\ out}{Energy\ in} \times 100\%$

$= \frac{157{,}500}{360{,}000} \times 100\%$

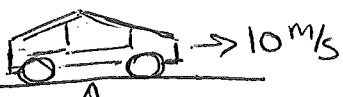
$= 44\ \%$

How fast does a cybertruck need to go in order to climb a 200 m hill and have a final speed of 10m/s.



$E = \frac{1}{2}mv^2$

$\sqrt{\frac{2E}{m}} = v = \sqrt{\frac{2(6030{,}000)}{3000}} = 63.4\ m/s$



$TME = PE + KE$

$PE = mgh$

$= 3000 \times 9.8 \times 200$

$= 5{,}880{,}000\ J$

$KE = \frac{1}{2}mv^2 = \frac{1}{2} \times 3000 \times 10^2$

$= 150{,}000\ J$

$= 6{,}030{,}000\ J$

200m