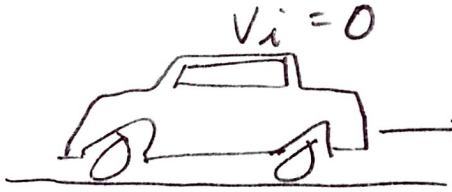
7.67 $\underline{1}$ person = 100 Watts = 100 Joules/sec

a) A 4.00 kW clothes dryer = $\frac{4000\ W}{100\ W/\text{person}}$ = 40.0 people

b) 800 MegaWatts

$= \frac{800\ e6\ W}{100\ W}$ = 8e6 people

7.73



a) Car has output of 40 horsepower $\times \frac{746\ W}{1\ hp} =$ 29840 W

Power $= \frac{\text{Work}}{\text{time}}$, so

$\text{time} = \frac{\text{Work}}{\text{Power}} = \frac{\text{Work}}{29840\ W}$

Work $= \Delta K = K_f - K_i$, so

$= \frac{1}{2}mv^2 - 0$

$= \frac{1}{2}(850)(15)^2 = 9.56e4\ J$

$\text{time} = \frac{9.56e4\ J}{29840\ W} = \boxed{3.20\ s}$

b) If also climbing a 3 meter high hill?

Work to climb hill vertically $= F \cdot d$

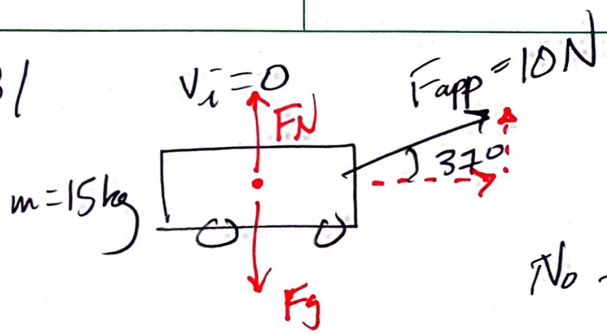
$= mg \cdot h$

$= (850)(9.8)(3)$

$= 2.5e4\ J$

$\text{time} = \frac{9.56e4 + 2.5e4\ J}{29840\ W} = \boxed{4.04\ s}$

7.81



No friction

a) $W = F_x \cos\theta$

What is x, though?

$F_{net} = ma$

$F_{appx} = max$

$10\cos 37 = 15\,a$

$a = 0.532 m/s^2$

$\Delta x = v_i t + \frac{1}{2}at^2 = \frac{1}{2}(0.532)(2s)^2$

$= 1.06m$

$W = F_x \cos\theta$

$= (10\cos 37)(1.06) = \boxed{8.50J}$

b) $Power = \vec{F} \cdot \vec{v}$

$v(2.0s) = v_f = v_i + at$

$= 0 + (0.532 m/s^2)(2s)$

$= 1.06 m/s$

$P = (10\cos 37)(1.06) = \boxed{8.50\,W}$

8.23

No air friction

a) $K_i = \frac{1}{2}mv^2$

$= \frac{1}{2}(0.015)(3\,m/s)^2$

$= 6.8e{-}2\,J$

b) Work done by gravity as it rises to peak?

$W = K_f - K_i$

$= 0 - 6.8e{-}3\,J$

$= \boxed{-6.8e{-}2\,J}$

c) $\Delta U = U_f - U_i$

$= mgh - 0$

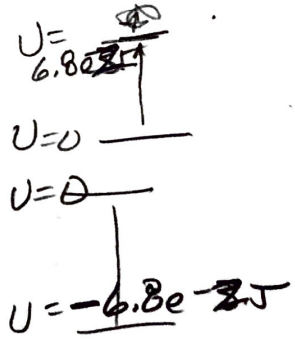
$= (0.015)(9.8)(h)$ Don't know height. Oh! It's a theoretical problem!

$\Delta U = -(K_f - K_i)$

$= -(0 - 6.8e{-}) = \boxed{6.8e{-}2\,J}$

d) U_g at max height $= 6.8e{-}2\,J$

e) If $h = 0$ at max height



f) Find max height?

$U = mgh$

$6.8e{-}2 = (0.015)(9.8)h$

$h = \boxed{0.459\,m}$