Saleena Jian
June 10th/15
Physics 11

Section 7.5: Power

Power is the rate at which work is done.

$\frac{J}{s}$ or W (watts)

$$P = \frac{W}{t} \quad W: J, \; t: s$$

Anyone can do a certain amount of work if you give them enough time, but

~~power is something that's actually worth bragging about~~

Example: Lover's Leap is a 122 m vertical climb. The record time of 4 min 25 s was achieved by Dan Osman (65 kg). What was his average power output during the climb?

$P = \frac{W}{t}$ $\quad W = F_{||} d$ ← harder to use, but sometimes works

$\sum E_i + W_{\text{not gravity}} = \sum E_f$ ← easier to use

$0 + W = E_p$

$W = mgh = 65 \times 9.8 \times 122 = 77,714 \text{ J}$

$P = \frac{W}{t} = \frac{77,714}{265 s} = \boxed{293.26 \text{ Watts}}$

Example: A 1000 kg car accelerates from rest to a velocity of 15 m/s in 4 s. Calculate the power output of the engine.

$P = \frac{W}{t}$

$\sum E_i + W_{\text{not gravity}} = \sum E_f$

$0 + W = E_K$

$W = \frac{1}{2} m v^2 = \frac{1}{2} (1000)(15)^2$

$= 112,500 \text{ J}$

$P = \frac{W}{t} = \frac{112,500}{4} = \boxed{28,125 \text{ Watts}}$