Chapter 6 - Work, Power + Energy

§6-1 Work + Energy

Work is not energy, but the transfer of energy to an object.

Work is directly related to the force* acting on an object and the distance over which the object travels

* The force must be acting parallel to the direction of motion

$$W = F_{\parallel} \Delta d$$

where W is work ($N \cdot m = J$)

$F_{\parallel}$ is the force acting in the direction of motion (N)

Δd is the distance travelled (m)

NOTE that work is a scalar quantity

MP|220

$\Delta d = 3.00\ m$

$F_{\parallel} = 2.00 \times 10^2\ N$

$W = ??$

$W = F_{\parallel} \Delta d$

$W = (2.00 \times 10^2\ N)(3.00\ m)$

$W = 6.00 \times 10^2\ J$

Situations when no work is done: (see p222-223)

① Apply a force but there is no motion (pushing a wall)

$W = F_{\parallel} \Delta d$ ($\Delta d \uparrow 0$)

② An object moving with constant velocity + no force. (hockey puck)

$W = F_{\parallel} \Delta d$ ($F_{\parallel} \uparrow 0$)

③ A force acts perpendicular to the direction of motion (carrying a suitcase)

$W = F_{\parallel} \Delta d$ ($F_{\parallel} \uparrow 0$)

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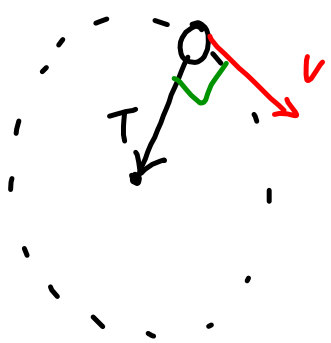
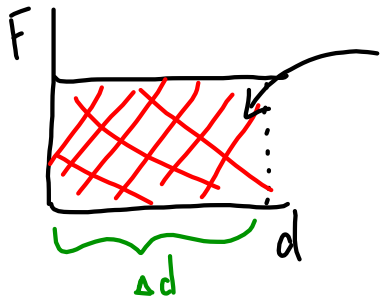


Since $T \perp$ the velocity, no work is done.

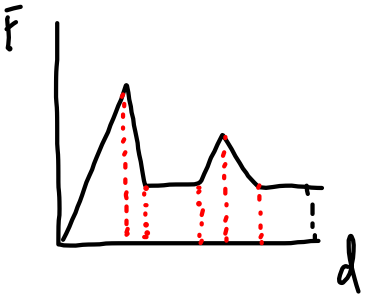
Consider a F-d graph:



area of rectangle = lxw

Area = $F \Delta d$

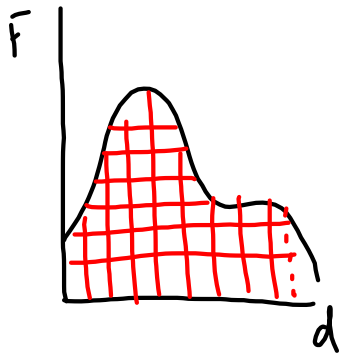
$\therefore$ Area (F-d) = WORK.



Area of trapezoid = $\frac{1}{2}(h_1+h_2)b$

Area of triangle = $\frac{1}{2}bh$

Area of rectangle = bh



← ① count squares
② use technology (Logger Pro or Calc)
③ Calculus

Look over MP/227-228

PP/221

PP/225

PP/229/11(A-D)

} HW Probe → Tues