

## Chapter 6 - Work, Energy + Power

### §6-1 Work and Energy (p218)

Work is not energy, but rather related to the transfer of energy to an object. When work is done on an object by a force, energy is transferred to the object.

Work is the product of the force acting on an object and the object's displacement. The force MUST act in the same direction as the displacement.

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

Where  $W$  is the work done on the object (J)

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

$\Delta d$  is the displacement (m)

NOTE: ① Work is a **SCALAR** quantity

② **UNITS:**  $1\text{J} = 1\text{N}\cdot\text{m}$

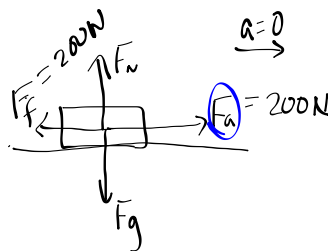
MP/220

$$F_a = 2.00 \times 10^2 \text{ N}$$

$$\Delta d = 3.00 \text{ m}$$

$$W = ?$$

What is the work done by the applied force ( $F_a$ )?



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

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

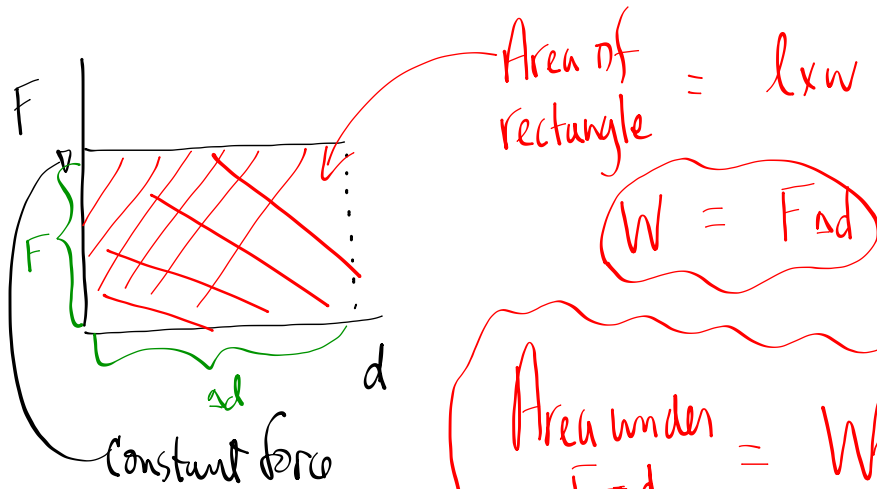
$$W = 6.00 \times 10^2 \text{ J}$$

## Situations in Which No WORK is Done

- ① If there is no displacement (i.e.  $\Delta d = 0$ )
- ② If there is displacement but no force (i.e.  $F_{||} = 0$ )
- ③ If the force is perpendicular to the displacement.

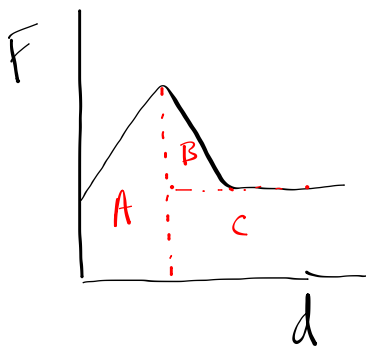
READ p222-223

Consider a F-d graph



Area under a F-d = Work

What if not a constant force?



$$\text{Work} = \text{Area}_A + \text{Area}_B + \text{Area}_C$$

TO DO

- ① PP/221
- ② Look over MP/224
- ③ PP/225
- ④ Look over MP/227
- ⑤ PP/229/11

$W = F_{\parallel} \Delta d$  or "No Work" Situations

Area