

MECHANICAL ADVANTAGE

MECHANICAL ADVANTAGE IS THE AMOUNT BY WHICH A MACHINE CAN MULTIPLY A FORCE (AKA FORCE RATIO)

- FORCE APPLIED TO THE MACHINE = INPUT FORCE
- FORCE THE MACHINE APPLIES TO THE OBJECT = OUTPUT FORCE OR RESISTANCE

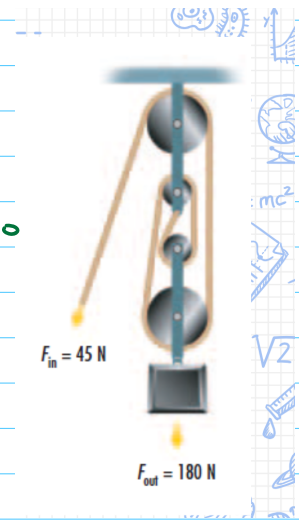
$$\text{MECHANICAL ADVANTAGE} = \frac{\text{OUTPUT FORCE (N)}}{\text{INPUT FORCE (N)}}$$

* A RATIO OF FORCES IN A MECHANICAL DEVICE *

$$\text{MECHANICAL ADVANTAGE} = \frac{\text{OUTPUT FORCE (N)}}{\text{INPUT FORCE (N)}}$$

$$= \frac{180\text{N}}{45\text{N}} = 4$$

NO UNITS
B/C IS A RATIO



* IN MOST CASES MA IS GREATER THAN 1

- MACHINES MULTIPLY INPUT FORCE TO CREATE LARGER OUTPUT FORCE

* IF MA IS LESS THAN 1

- MACHINE CAN STILL BE USEFUL FOR JOBS THAT NEED LESS OUTPUT FORCE → USUALLY USED TO MAGNIFY DISTANCE

EX: FISHING ROO

- NEEDS MORE FORCE/EFFORT TO CATCH FISH THAN FISH WEIGHS

MECHANICAL ADVANTAGE → THE AMOUNT BY WHICH A MACHINE CAN MULTIPLY A FORCE (AKA A FORCE RATIO)

THE FORCE APPLIED TO A MACHINE IS CALLED **INPUT FORCE**

THE FORCE THE MACHINE APPLIES TO THE OBJECT IS CALLED THE **OUTPUT FORCE** OR RESISTANCE

$$\text{MECHANICAL ADVANTAGE} = \frac{\text{OUTPUT FORCE (N)}}{\text{INPUT FORCE (N)}} \\ (\text{MA})$$

* IS A RATIO OF FORCES IN A MECHANICAL DEVICE *

EX: $MA = \frac{\text{OUTPUT}}{\text{INPUT}} = \frac{180\text{N}}{45\text{N}} = 4$

NO UNITS IN MECH ADV. B/C IT IS A RATIO