

Quiz on Tuesday - Statics

Force Table "situation"

Lab write-up due  
TUESDAY

situation

→ Use forces, not masses

not  
vectors

→ Got it right? Let me know; not much error analysis

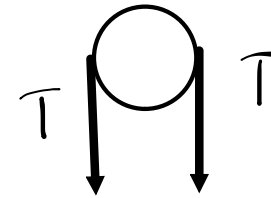
# AN APPLICATION OF STATICS: PULLEYS

*\* Problem solving techniques*  
TWO ASSUMPTIONS:  
 → principles of pulleys  
 → multiple FBD's

- PULLEYS ARE
  - MASSLESS
  - FRICTIONLESS

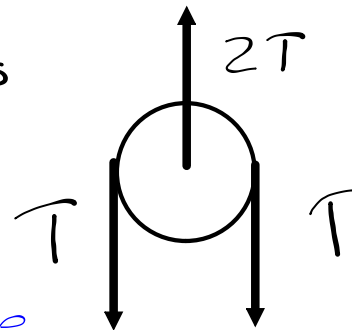
TWO THINGS YOU NEED TO KNOW:

1) THE TENSION ACTING ON ONE SIDE OF THE PULLEY EQUALS THE TENSION ON THE OTHER SIDE.



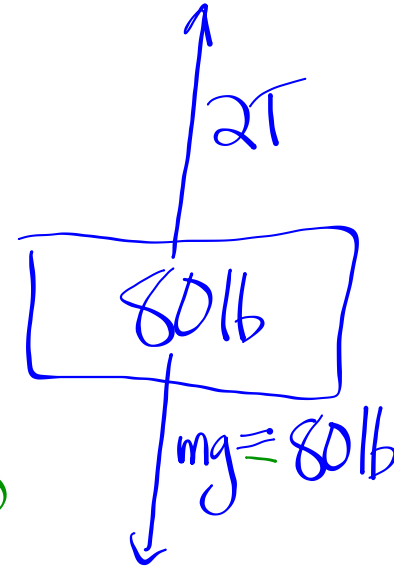
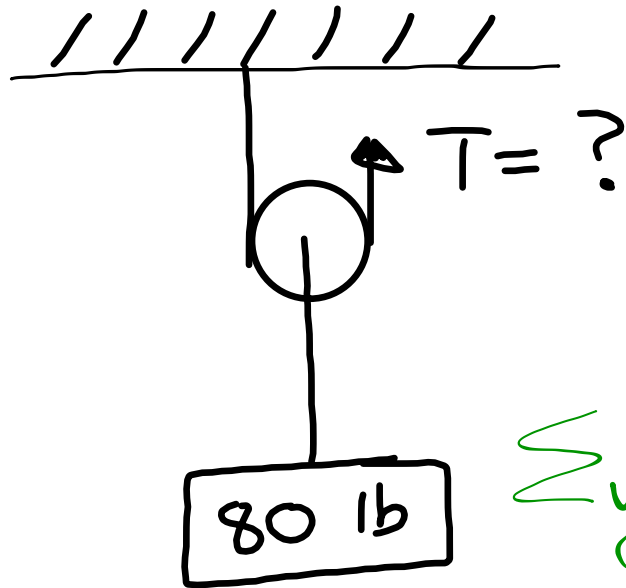
2) RULES OF STATICS APPLY

$$\sum F_y = 0$$



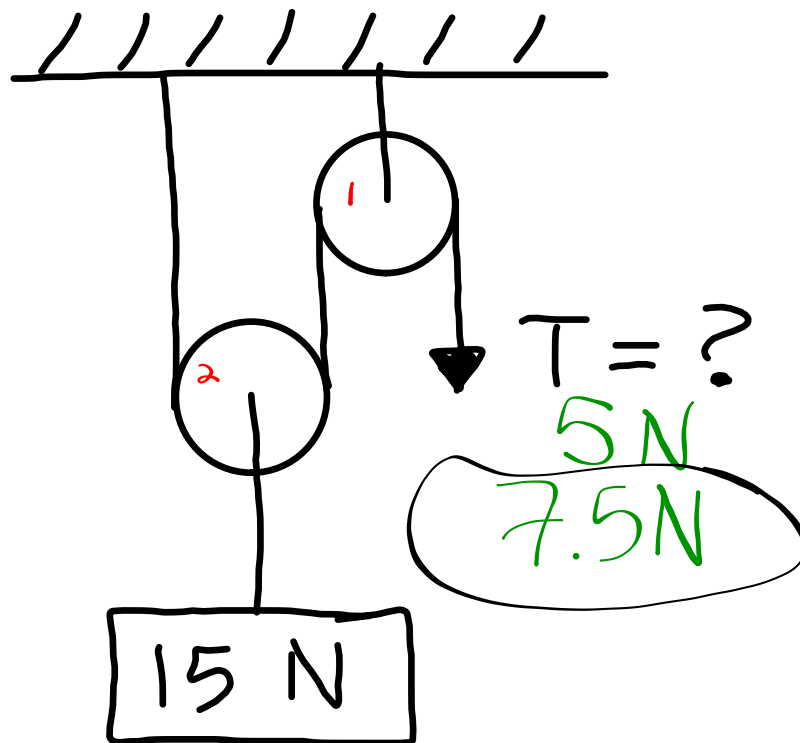
3) Tension along any one rope, cable, string, etc. is always the same and acts in both directions

# EXAMPLE 1



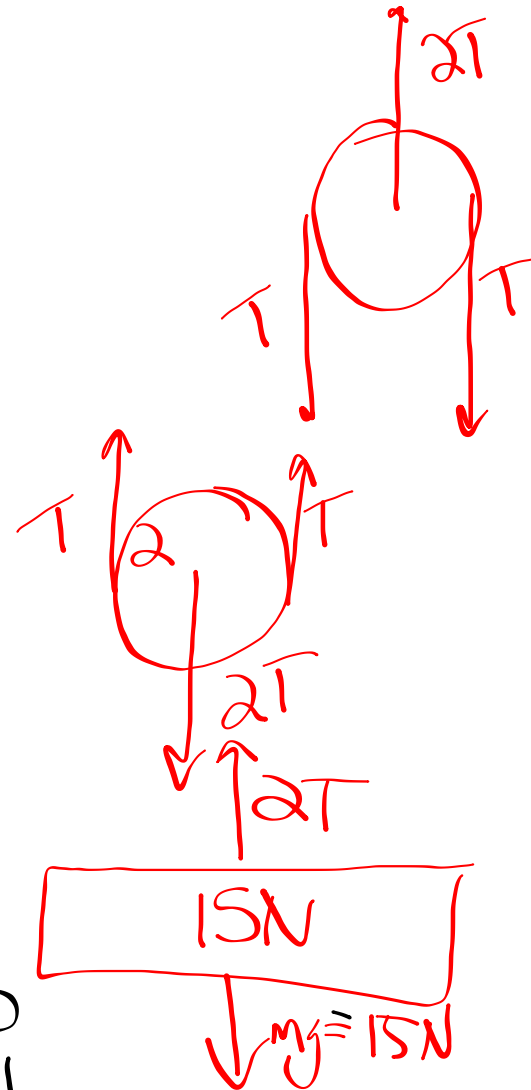
$$\begin{aligned}\sum y &= -80 + 2T = 0 \\ 2T &= 80 \\ T &= 40 \text{ lb}\end{aligned}$$

## EXAMPLE 2

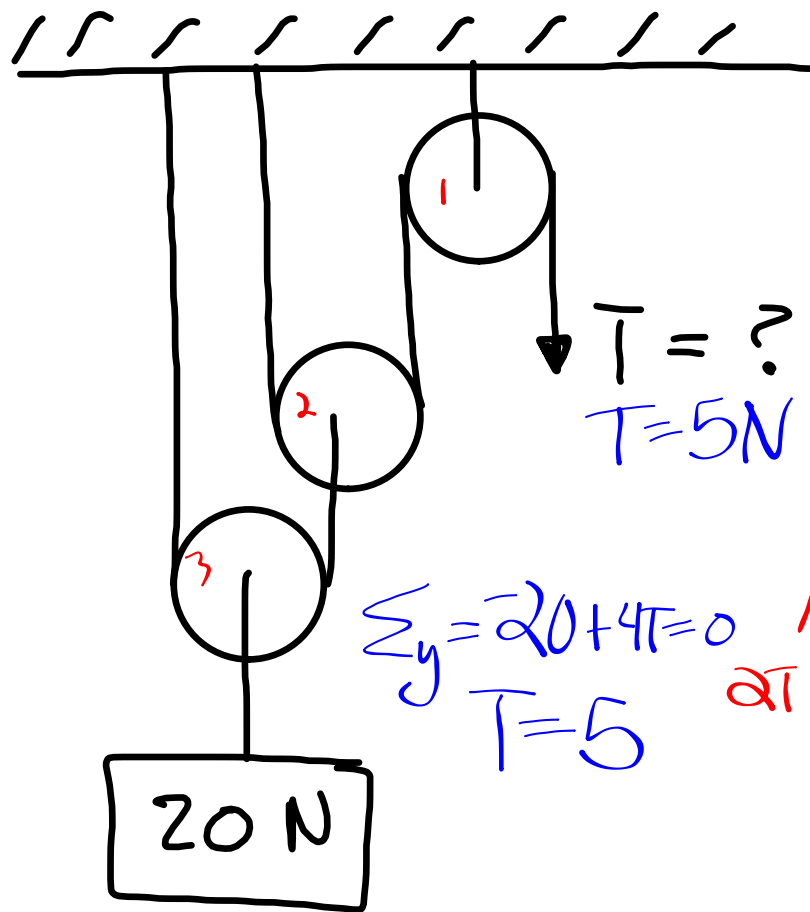


$$\sum F_y = -15\text{ N} + 2T = 0$$

$$T = 7.5\text{ N}$$

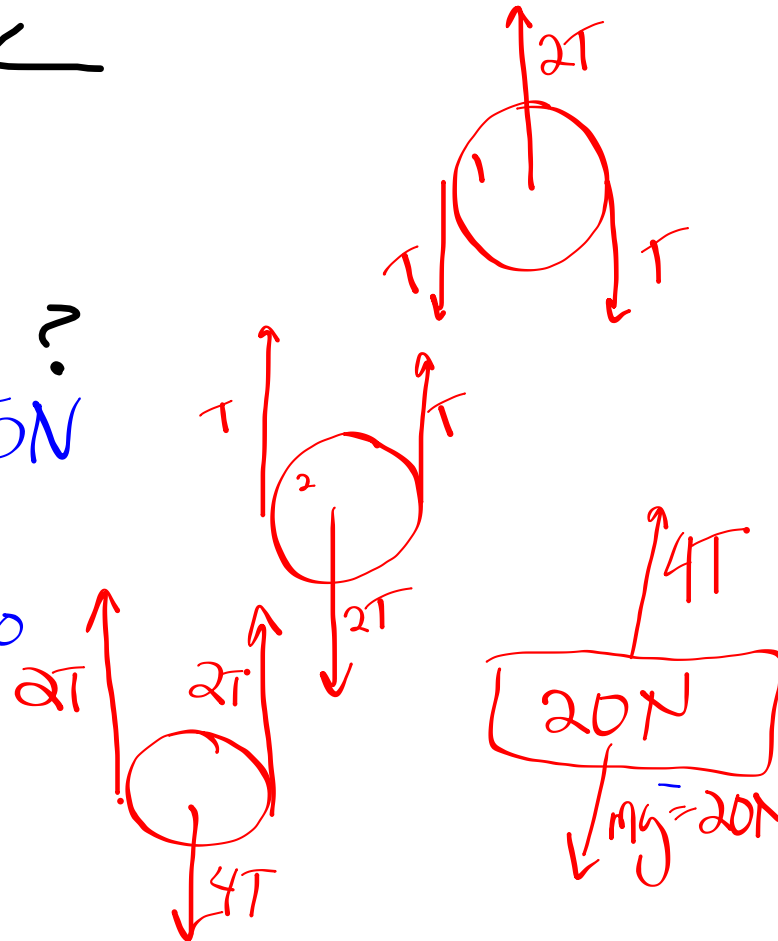


# EXAMPLE 3

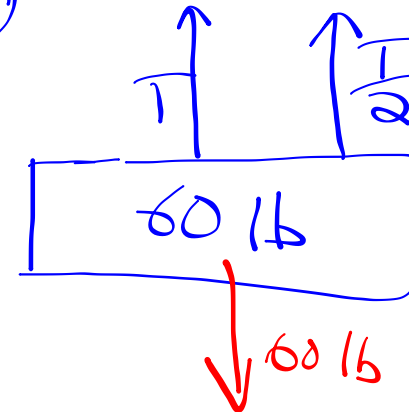
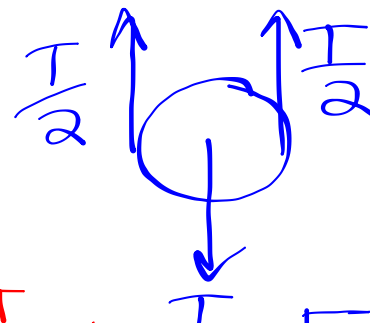
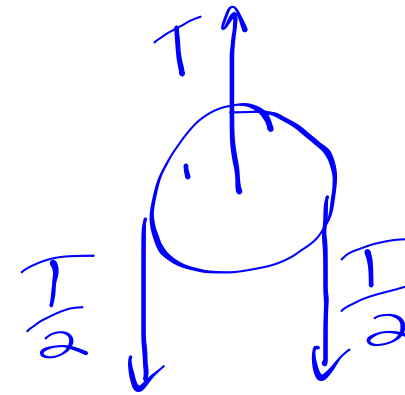
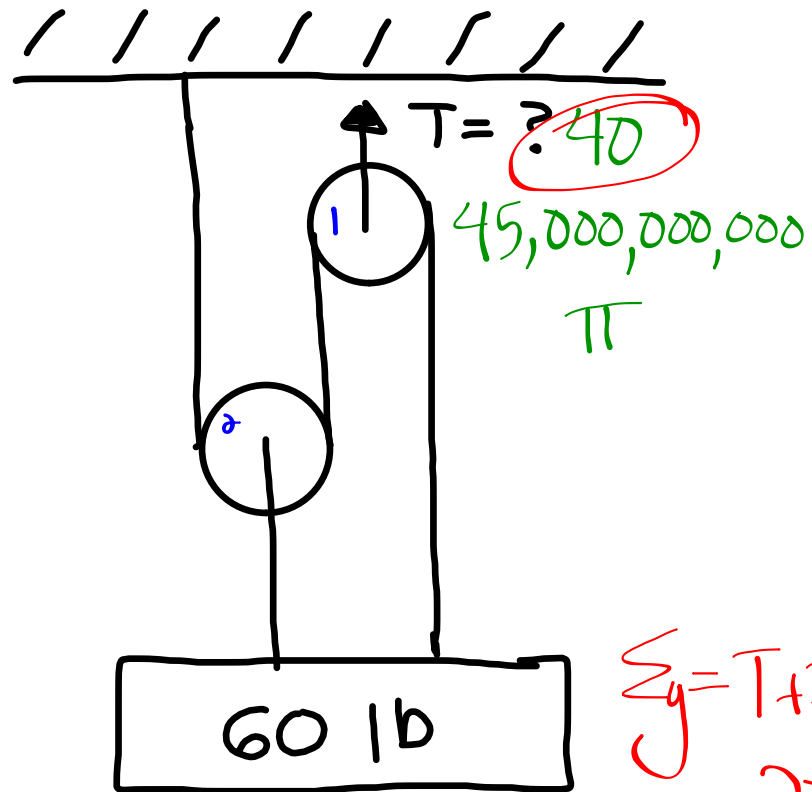


$$\sum_y = -20 + 4T = 0$$

$$T = 5$$

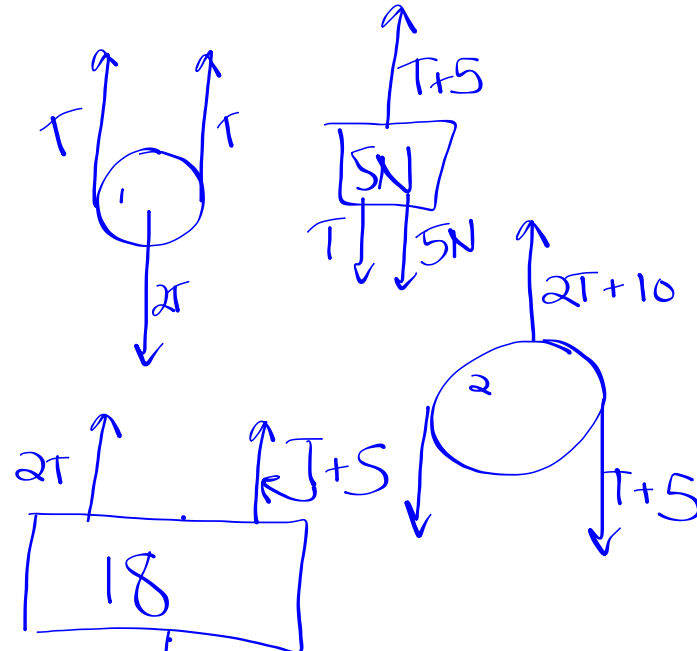
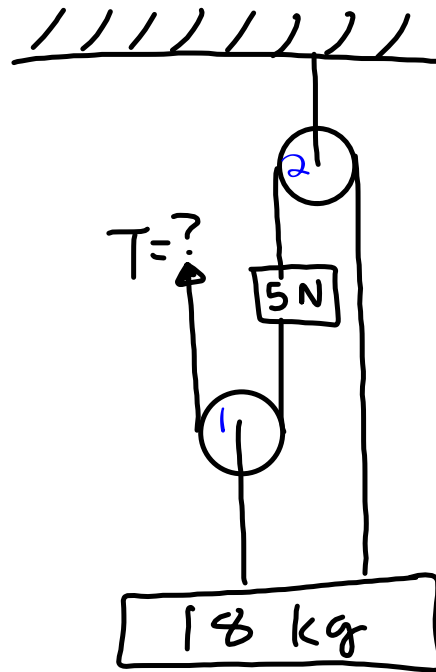


# EXAMPLE 4



$$\begin{aligned}\sum F_y &= T + \frac{T}{2} - 60 = 0 \\ 2T + T &= 120 \\ T &= 40\end{aligned}$$

# EXAMPLE 5



$$\begin{aligned}\sum F_y &= 2T + T + 5 - 176 = 0 \\ 3T &= 171 \\ T &= 57 \text{ N}\end{aligned}$$

$$\begin{aligned}mg &= 18 \cdot 9.8 \\ &\approx 176\end{aligned}$$

