

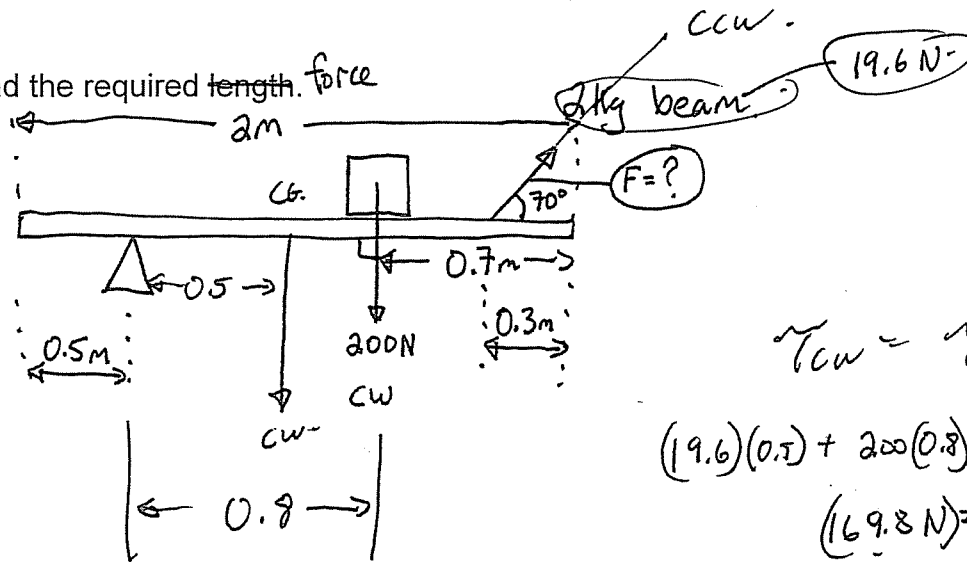
# Solution

## Physics 12 Chapter 8 Torque Worksheet #3

- Includes problems where the beam has mass, forces at an angle, and bridge type problems with two possible pivots.

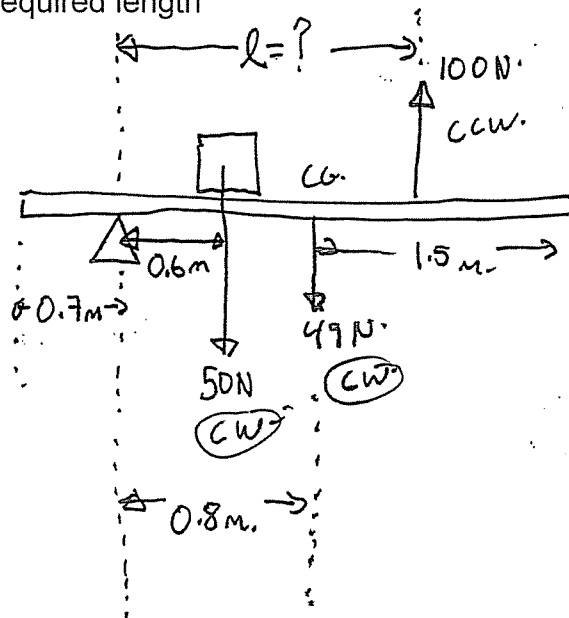
Name: \_\_\_\_\_

1. Find the required length. force



$$\begin{aligned} \tau_{CW} &= \tau_{CCW} \\ (19.6)(0.5) + 200(0.8) &= F \sin 70 (1.2) \\ (169.8 \text{ N}) &= F (1.13 \text{ m}) \\ F &= 150.7 \end{aligned}$$

2. Find the required length

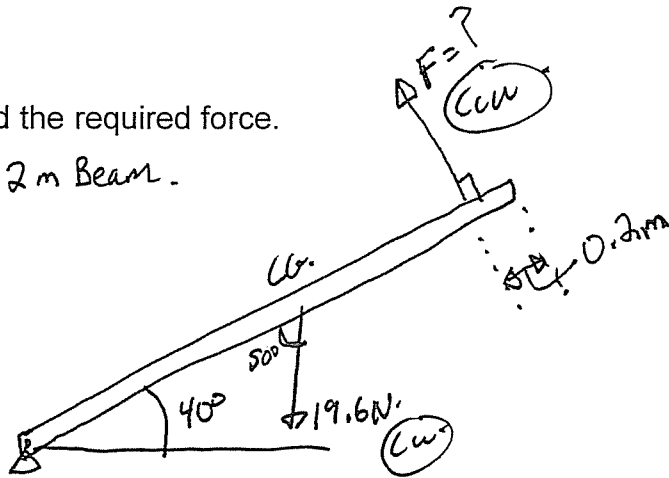


3 m Beam  
5 kg mass = 49 N

$$\begin{aligned} \tau_{CW} &= \tau_{CCW} \\ 50 \times 0.6 + 49 \times 0.8 &= l \cdot 100 \\ 69.2 &= l \cdot 100 \\ l &= 0.692 \text{ m} \end{aligned}$$

3. Find the required force.

2 Kg 2 m Beam.



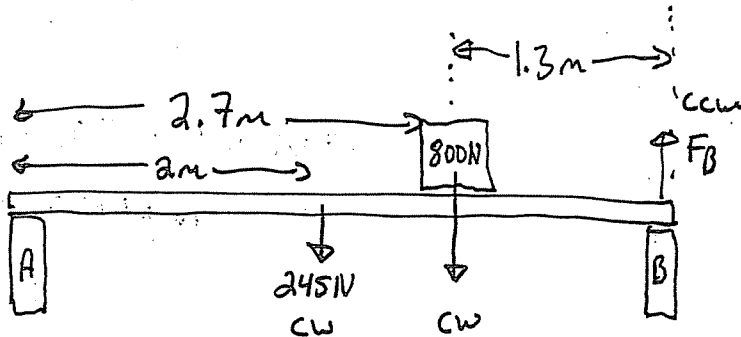
$$\sum \tau_{CW} = \sum \tau_{CCW}$$

$$19.6 \times 1 \times \sin 90^\circ = F \times 1.8$$

$$19.6 = F(1.8)$$

$$F = 8.34 \text{ N}$$

4. Find the required force.



Beam, 4m, 25 Kg

$$F_A = ? \quad F_B = ?$$

$$\sum \tau_{pA} \leq F = 0$$

$$F_A + 662.5 = 245 + 800$$

$$F_A = 382.5 \text{ N}$$

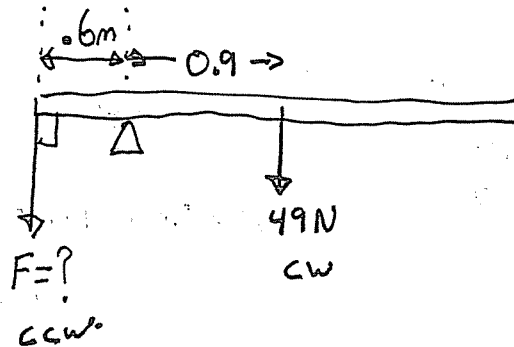
pivot @ A.

$$(245)(2) + 800(2.7) = F_B \cdot 4$$

$$2650 = F_B \cdot 4 \rightarrow F_B = 662.5 \text{ N}$$

5. Find the required force

3 m Beam, 5 Kg



$$(49)(0.9) = (6) F$$

$$F = 73.5 \text{ N}$$