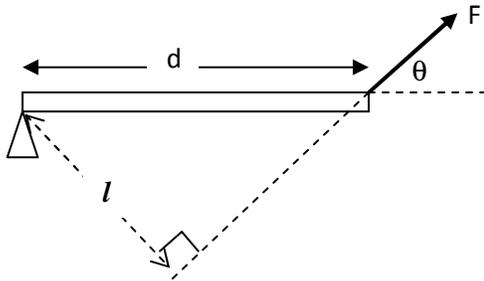


Torque Worksheet #2 (Lever Arm Distance)

A.Byres

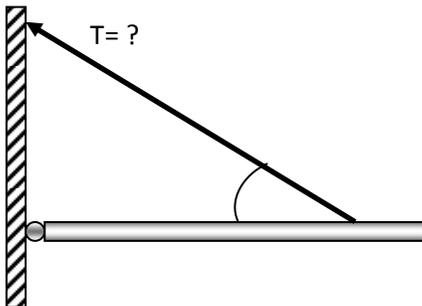
- 1) State the 2nd Condition for equilibrium _____
- 2) When using the 2nd Condition, the force is typically _____ to the _____
- 3) If the Force is not \perp to the direction then you will need to use either the _____ or you will need to use the _____ .
- 4) The Lever arm distance or Moment arm as it is also known are found perpendicular to _____ and it **must** pass through the _____ .
- 5)



In order to find the net torque on the beam shown on the left we must either use lever arm distance or force perpendicular to the beam.

If the beam has a 5.0 kg mass, $\theta = 60^\circ$ and d , the length of the beam is 1.8m find the **F** needed to produce equilibrium, both ways!

- a) Use the diagram above and find out what the lever arm distance would be if the $d = 1.8$ m and the angle (θ) was a) 70° , b) 50° and c) 30°
- b) What do you notice about l ?
- c) What does this mean for the magnitude of F if equilibrium is to be maintained?
- 6) A uniform beam of 5.00 kg, and 2.50m length is suspended as shown. What will be the tension in the supporting rope connected 0.500m from the non-hinged end at a 40.0° angle.



Draw a good ¼ page Free Body Diagram for each problem from here onwards!

- 7) Repeat the question from above, but now a 7.5 kg mass is suspended from the right hand end, what will the new tension be?
- 8) Solve for the tension in the cable if the beam has a mass of 21 kg, has a length of 3.0m long and is at an angle of 30° to the vertical. The cable is $1/3$ from the top of the beam.

