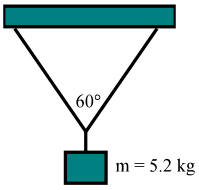
1. A lever arm 2.5 m long has a force of 175 N applied to it right angles. What is the torque generated?

2. What are the conditions for translational equilibrium?

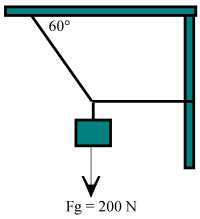
3. What are the conditions for static equilibrium?

4. What is the tension in each of the strings below? The beam in part C is massless.

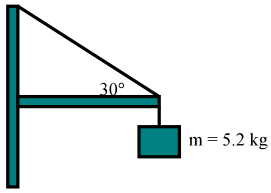
a)



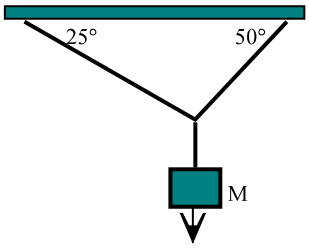
b)



c)

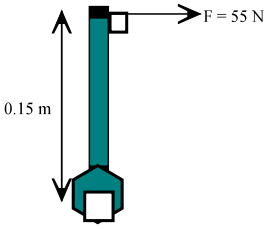


5. What must be the tension in each string if the mass M = 12 kg?

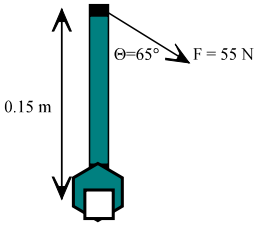


6. Calculate the torque generated about the bolt in each wrench below.

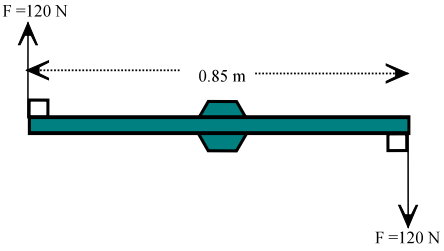
a)



b)

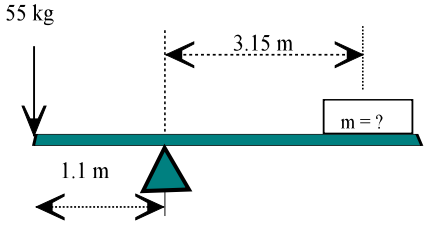


7. Calculate the total torque generated about the lug nut in the problem below.

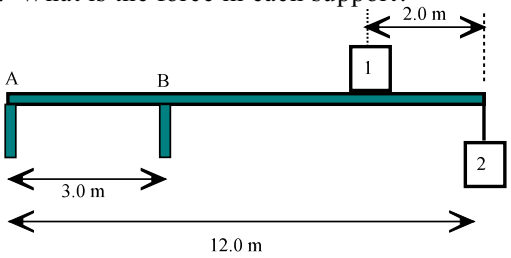


8. Kahlil (m = 125 kg) and Ghibran (m = 75 kg) are sitting on a 4.0 m long massless seesaw. If Ghibran sits on the end of the seesaw, how far from the pivot must Kahlil sit to balance him?

9. What mass must be placed on the seesaw to balance the 55 kg mass?

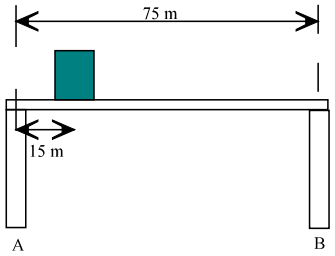


10. The 12.0 m long I-Beam (m = 650 kg) in the diagram is secured as a cantilever beam. A construction worker (m_1 = 75 kg) is sitting on the beam as indicated, with his gear hanging over the side (m_2 = 275 kg). What is the force in each support?

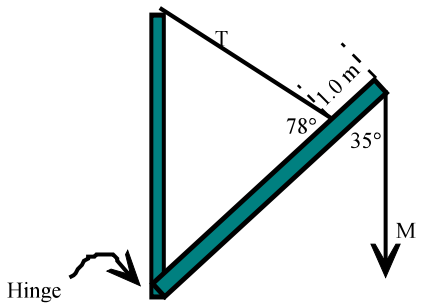


11. The wheelbarrow shown is carrying a mass of 75 kg. The centre of mass is located 55 cm behind the front wheel. What must be the force exerted by the man on the handle at a distance of 1.75 m behind the front wheel?

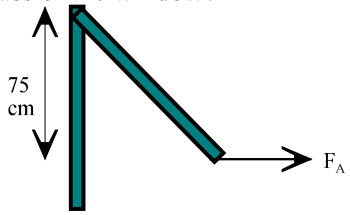
12. A truck of mass 1200 kg is at rest on a uniform bridge of mass 1700 kg. The bridge is 75 m in length. If the truck is 15 m from support "A", what is the force in each support?



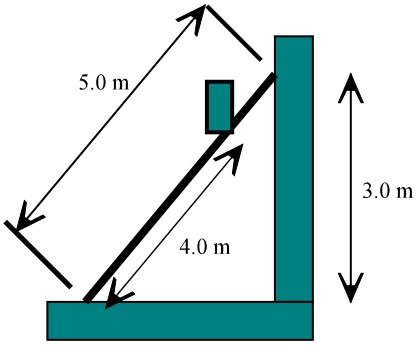
13. The crane derrick below has a mass of 125 kg and an overall length of 5.5 m. M = 2500 kg
    a) What is the Tension T, in the cable?
    b) What are the horizontal and vertical forces on the hinge?
    **this is quite insane...*



14. A duck holds a hanging window in static equilibrium with a horizontal force of 125 N. If the window is 95 cm long, what is the mass of the window?



15. A 5.0 m long ladder with a mass of 22 kg is leaning against a frictionless wall at a point 4.0 m above the floor. A boy of mass 42 kg is standing 4.0 m from the bottom of the ladder.
    a) What must be the force of the wall on the ladder?
    b) What must be the force of friction on the ladder?
    c) What must be the force of the floor on the ladder?



1	437.5 N		9	19.2 kg
2	$F_{NET} = 0$		10	F_a = 16 170 N [up] F_B = 25 970 N [down]
3	$F_{NET} = 0$ $T_{net} = 0$		11	231 N [up]
4a	29.4 N		12	F_a = 17 738 N F_b = 10682 N
4b	231 N 115 N		13a	T = 18006 N
4c	102 N		13b	F_x = 10 328 N [right]
5	T_1 = 78.3 N T_2 = 110 N		13c	F_y = 10 975 N [down]
6a	8.25 N		14	m = 33 kg
6b	7.47 N		15a	F_W = 580 N
7	102 N·m		15b	F_{Fr} = 580 N
8	1.20 m		15c	F_N = 627 N