Static Equilibrium

Pre-Lecture Questions

Problem Set #32 (due next time)

Lecture Outline

1. The Definition of Equilibrium
2. Examples Involving Two Equations

Pre-Class Summary:

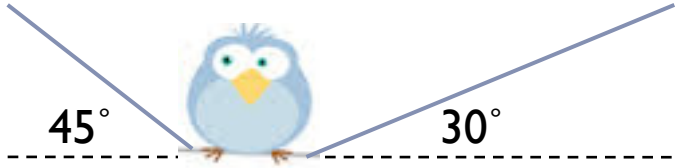
A system in static equilibrium feels no net force and no net torque.

$$\Sigma\vec{\tau}_P = 0 \qquad \Sigma\vec{F} = 0$$

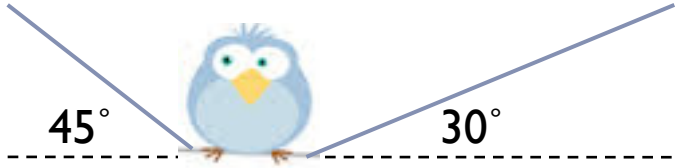
For an object in equilibrium, the sum of the torques is zero about any point. Judicious choice of this point can make the algebra of the solution easier.

When there are more unknowns than equation from the 2nd Law, numerical solution is impossible and the system is said to be "statically indeterminate."

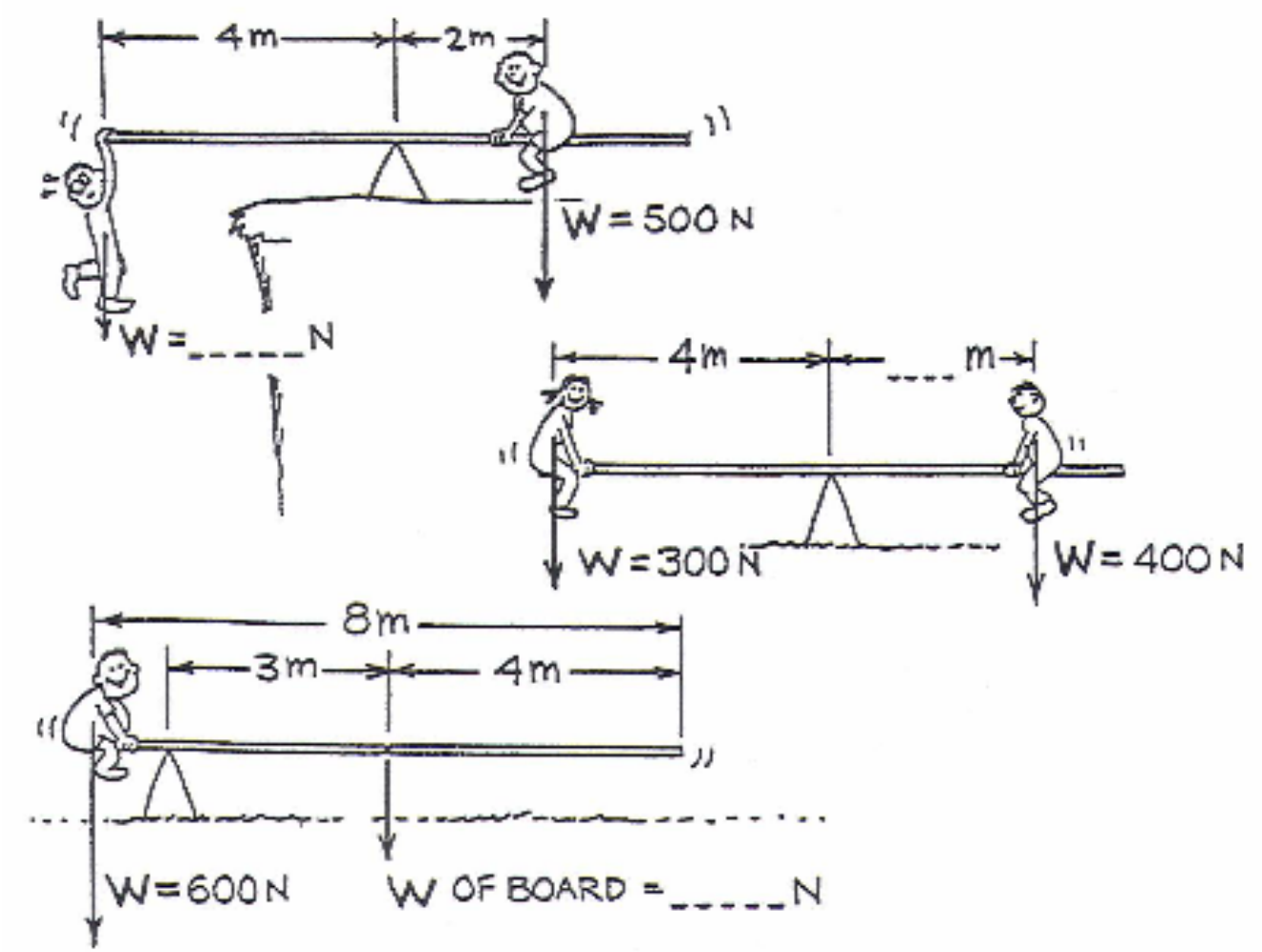
Example 1: A 2.00kg bird rests on a wire as shown. Draw the forces that act on the bird.



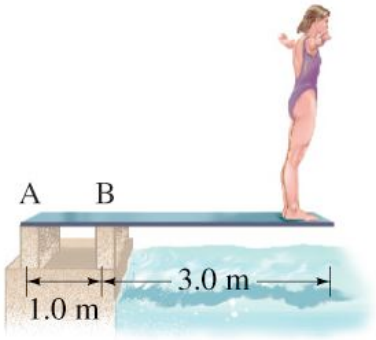
Example 2: A 2.00kg bird rests on a wire as shown. Find the tension in each rope.



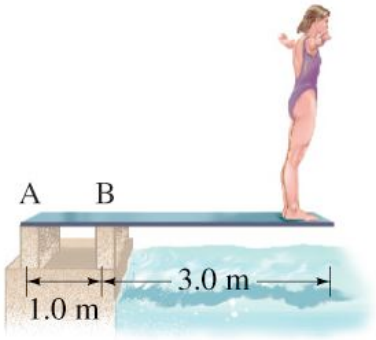
Fill in the blanks using your knowledge of equilibrium.



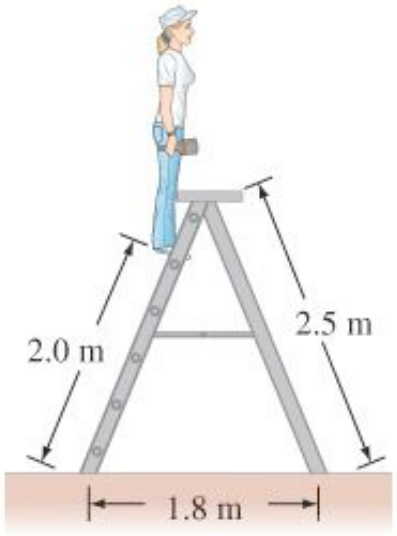
Example 3: A 60.0kg diver stands at the end of a 4.00m long board of mass 10.0kg. Draw the forces that act on the board.



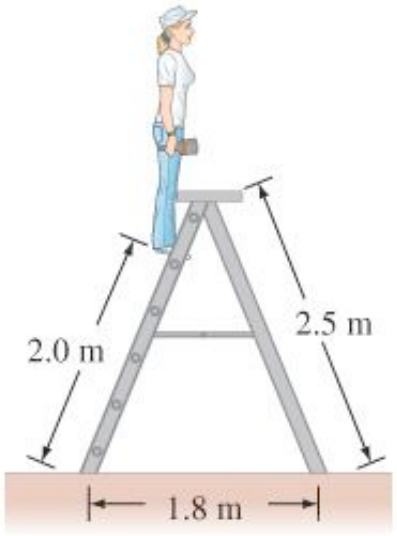
Example 4: A 60.0kg diver stands at the end of a 4.00m long board of mass 10.0kg. Find the force exerted at the points labeled A and B.



Example 5: A 60kg worker stands on a 5.0kg ladder. Draw the forces that act on the ladder.



Example 6: A 60kg worker stands on a 5.0kg ladder. Find the magnitude of each force that acts on the ladder.



Lecture 32 - Summary

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