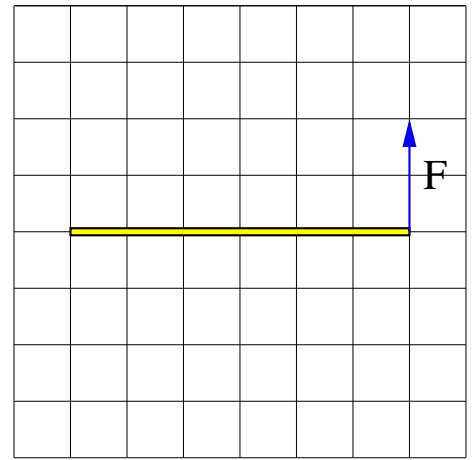


The figure shows a top view of an object momentarily at rest on a frictionless surface. It shows all of the horizontal forces acting on the object; the vertical forces acting on the object, weight and normal force, always add to zero. Towards the top of the page is North and to the right is East. The grid squares in each figure give a scale for both force and distance. For forces, the width of each square represents 0.15 N, and for distances, the width of each square represents 10 cm. The density of each object is uniform, making the center-of-mass location easy to determine. There is no fixed axle.



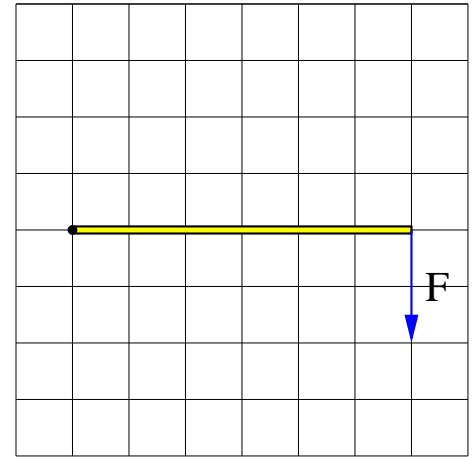
1. The rotational inertia of a stick about its midpoint is $(1/12)ML^2$. If the mass of this stick is 500 grams, find the rotational inertia, and also the torque, about the center of mass.
2. Find the angular acceleration of the stick and the acceleration of the center of mass at this instant of time.
3. Suppose the location of the 0.3-N force is moved so that it is only 10 cm from the west end of the stick. In this case, find the angular acceleration of the stick and the acceleration of the center of mass at this instant of time.
4. For what location of the 0.3-N force, if any, would the angular acceleration of the stick be zero?
5. For what location of the 0.3-N force, if any, would the acceleration of the center of mass be zero?

The figure shows a top view of an object momentarily at rest on a frictionless surface. It shows all of the horizontal forces acting on the object except one; the vertical forces acting on the object, weight and normal force, always add to zero.

Towards the top of the page is North and to the right is East.

The grid squares in each figure give a scale for both force and distance. For forces, the width of each square represents 0.15 N, and for distances, the width of each square represents 10 cm.

The density of each object is uniform, making the center-of-mass location easy to determine. The black dot represents a fixed axle.



6. The rotational inertia of a stick about its endpoint is $(1/3)ML^2$. If the mass of this stick is 500 grams, find the rotational inertia, and also the torque, about the fixed axle.

7. Find the angular acceleration of the stick and the acceleration of the center of mass at this instant of time.

8. Find the force on the stick by the fixed axle.

9. Suppose the location of the 0.3-N force is moved so that it is only 10 cm from the axle. In this case, find the force on the stick by the fixed axle.

10. For what location of the 0.3-N force would the force on the stick by the fixed axle be zero?