Answer #41

The answer is (a): the tricycle will move in the same direction as when the pedal is up, the forward direction, as seen in an mpeg video by clicking on the photograph below.

One straightforward way to see this is to consider the torque around the point of contact of the wheel with the tabletop. In both cases the torque is in the same direction: counterclockwise when viewed as in the photographs, causing the wheel to rotate counterclockwise about the contact point and therefore causing the tricycle to move forward.

A more thorough analysis of this motion can be made by employing a "pedal extender," which extends the pedal downward so that the force can be applied at radii less than, equal to, or greater than the radius of the wheel. These cases can be seen in mpeg videos by clicking on the following listings:

- pulling radius less than the radius of the wheel, so the tricycle moves forward, the same as the case in this problem.
- pulling radius greater than the radius of the wheel, so the tricycle moves backwards.
- pulling radius equal to the radius of the wheel, so the tricycle remains stationery while the wheel rotates.

Archive 3

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For questions and comments regarding the *Question of the Week* contact

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