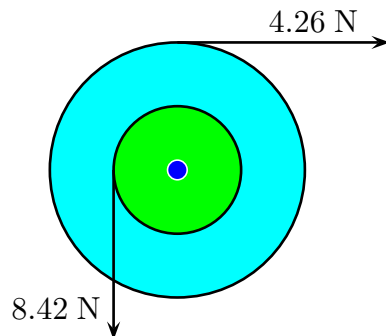


This print-out should have 6 questions. Multiple-choice questions may continue on the next column or page – find all choices before answering.

Torque on Cylinder

001 10.0 points

A one-piece cylinder has a core section protruding from the larger drum and is free to rotate around its central axis. A rope wrapped around the drum of radius 1.1 m exerts a force of 4.26 N to the right on the cylinder. A rope wrapped around the core of radius 0.62 m exerts a force of 8.42 N downward on the cylinder.



What is the magnitude of the net torque acting on the cylinder about the rotation axis?

Correct answer: 0.5344 N · m.

Decelerated Grinding Wheel

002 (part 1 of 2) 10.0 points

The motor driving a grinding wheel with a rotational inertia of 0.43 kg m^2 is switched off when the wheel has a rotational speed of 36 rad/s. After 12 s, the wheel has slowed down to 28.8 rad/s.

What is the absolute value of the constant torque exerted by friction to slow the wheel down?

Correct answer: 0.258 N m.

003 (part 2 of 2) 10.0 points

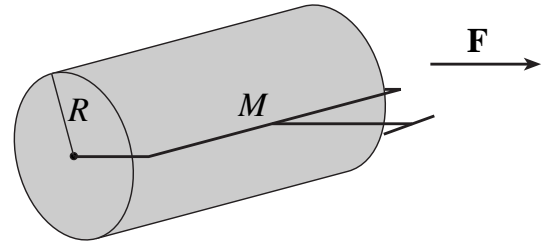
If this torque remains constant, how long after the motor is switched off will the wheel come to rest?

Correct answer: 60 s.

Lawn Roller 01

004 10.0 points

A constant horizontal force of 210 N is applied to a lawn roller in the form of a uniform solid cylinder of radius 0.31 m and mass 10 kg.



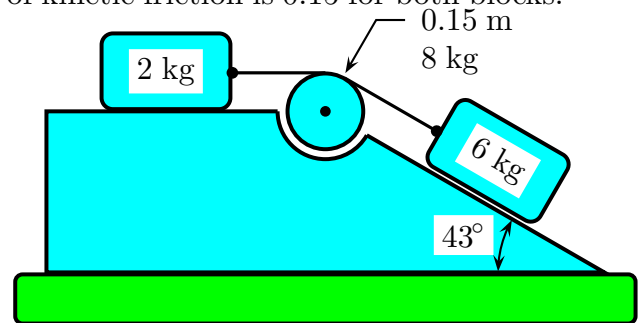
If the roller rolls without slipping, calculate the acceleration of the center of mass. $I_{\text{cm}} = \frac{1}{2} M R^2$ and the acceleration of gravity is 9.8 m/s^2 .

Correct answer: 14 m/s².

Blocks and a Wedge

005 (part 1 of 2) 10.0 points

A block of mass 2 kg and one of mass 6 kg are connected by a massless string over a pulley that is in the shape of a disk having a radius of 0.15 m, and a mass of 8 kg. In addition, the blocks are allowed to move on a fixed block-wedge of angle 43° , as shown. The coefficient of kinetic friction is 0.15 for both blocks.



What is the acceleration of the two blocks? The acceleration of gravity is 9.8 m/s^2 . Assume the positive direction is to the right.

Correct answer: 2.55925 m/s².

006 (part 2 of 2) 10.0 points

Find the tension in the horizontal part of the string.

Correct answer: 8.05849 N.