This print-out should have 9 questions. Multiple-choice questions may continue on the next column or page - find all choices before answering.

## Child on a MerryGoRound 02 <br> 001 (part 1 of 2) $\mathbf{1 0 . 0}$ points

A child of mass 51.8 kg sits on the edge of a merry-go-round with radius 2.8 m and moment of inertia $324.89 \mathrm{~kg} \mathrm{~m}^{2}$. The merry-go-round rotates with an angular velocity of $2.9 \mathrm{rad} / \mathrm{s}$.

What radial force does the child have to exert to stay on the merry-go-round?

Correct answer: 1219.79 N.

## 002 (part 2 of 2) $\mathbf{1 0 . 0}$ points

The child then walks towards the center of the merry-go-round and stops at a distance 1.064 m from the center. Now what is the angular velocity of the merry-go-round?

Correct answer: $5.52732 \mathrm{rad} / \mathrm{s}$.

## Serway CP 0855 D <br> 003 (part 1 of 2) 10.0 points

A cylinder with moment of inertia $32.5 \mathrm{~kg} \mathrm{~m}^{2}$ rotates with angular velocity $4.94 \mathrm{rad} / \mathrm{s}$ on a frictionless vertical axle. A second cylinder, with moment of inertia $37.7 \mathrm{~kg} \mathrm{~m}^{2}$, initially not rotating, drops onto the first cylinder and remains in contact. Since the surfaces are rough, the two eventually reach the same angular velocity.


Before


After

Calculate the final angular velocity.

004 (part 2 of 2) $\mathbf{1 0 . 0}$ points
Show that energy is lost in this situation by calculating the ratio of the final to the initial kinetic energy.

Correct answer: 0.462963 .

## Unwinding a Wheel 01 005 (part 1 of 2) 10.0 points

A wheel of radius 30 cm , mass 1 kg , and moment of inertia $0.045 \mathrm{~kg} \mathrm{~m}^{2}$ is mounted on a frictionless, horizontal axle as shown. A light cord wrapped around the wheel supports an object of mass 0.9 kg .


Find the tension $T$ in the cord. The acceleration due to gravity is $9.8 \mathrm{~m} / \mathrm{s}^{2}$.

Correct answer: 3.15 N.
006 (part 2 of 2) $\mathbf{1 0 . 0}$ points
What is the angular acceleration of the wheel?
Correct answer: $21 \mathrm{rad} / \mathrm{s}^{2}$.

## Beam with Pin and Cable $007 \quad 10.0$ points

Two weights attached to a uniform beam of mass 36 kg are supported in a horizontal position by a pin and cable as shown in the figure.


What is the tension in the cable which supports the beam? The acceleration of gravity is $9.8 \mathrm{~m} / \mathrm{s}^{2}$.

Correct answer: 0.627791 kN .
Tipler PSE5 1232
008 (part 1 of 2) $\mathbf{1 0 . 0}$ points
The uniform diving board has a mass of 26 kg .


Find the force on the support $A$ when a 68 kg diver stands at the end of the diving board. The acceleration of gravity is $9.81 \mathrm{~m} / \mathrm{s}^{2}$.

Correct answer: 3.05091 kN .

009 (part 2 of 2) $\mathbf{1 0 . 0}$ points
Find the force on the support $B$ at that same instant.

Correct answer: 3.97305 kN .

