Question #119

A mass $M$, that we will call the "cart mass," on a level air track, is connected by a piece of audiotape passing over a nearly frictionless air pulley to a much smaller mass $m<<M$, that we will call the "accelerating mass," as seen in the photograph at the left below.

Releasing $M$ allows $m$ to accelerate it along the air track. The timer measures the time taken for a flag on the top of the air track glider to travel from photocell gate "A" to gate "B," which turns out to be exactly 2.00 seconds. See a video of the action by clicking your mouse on the photograph at the left above.

Now suppose that the same experiment is performed with cart mass $M$ being increased to $2M$, as seen in the photograph at the right above. How long will the glider take to travel the distance $D$ from photocell gate "A" to gate "B"?

The time taken for mass $m$ to accelerate mass $2M$ a distance of $D$ from A to B will be:

- (a) 4 seconds.
- (b) 2.83 seconds
- (c) 2 seconds (the same).
- (d) 1.41 seconds.
- (e) 1 second.

Click here for Answer #119 after September 9, 2002.
For questions and comments regarding the *Question of the Week* contact [Dr. Richard E. Berg](mailto:drberg@umd.edu) by e-mail or using phone number or regular mail address given on the [Lecture-Demonstration Home Page](http://www.lhc.umd.edu/ldh).