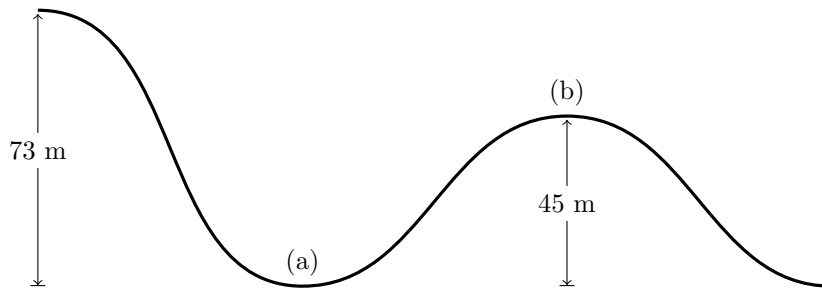


Energy #4

1. A 1300-kg roller coaster starts at rest on the top of a 73-meter hill. The track goes down to ground level before going up a second hill with a height of 45 meters. There is no friction.



- (a) How fast is the coaster travelling at the bottom of the first hill?

- (b) How fast is the coaster travelling at the top of the second hill?

- (c) Now, let's add friction to this problem. With friction, the roller coaster does not make it to the top of the second hill; instead, it only reaches a height of 32 m before stopping. How much work is done by friction?

Name:

Date:

Period:

2. A 2-kg block is kicked up a ramp with an initial speed of 5 m/s.



- (a) Assuming no friction, how high up the ramp would the block reach?

- (b) Instead, the block only makes it up 1.1 meters. How much work was done by friction?

3. Thomas the Tank Engine ($m = 11\,500\text{ kg}$) is barreling down the track at a speed of 45 m/s. Batman's Batmobile has stalled at a level crossing 600 meters in front of him. Thomas applies the brakes and comes to a stop just before running over the Batmobile.

- (a) How much work did Thomas's brakes do?

- (b) What was the force of Thomas's brakes?