

## Planet Holloway websheet 5.2

### AP Physics C - Chapter 5

You may print this out and write on it or work on your own paper.

### Show all work.

1. A hamster on a 1.3 m leash is whirled around my head at a constant 2.2 m/s. If there is 1.5 N of tension in the leash, how much work does the leash do during  $\frac{3}{4}$  of a revolution?
2. The batmobile (1700 kg) is moving at 47 m/s when suddenly catwomen jumps into the road. If the breaks apply 11 050 N of force, how fast will the batmobile be going when it hits catwomen 146.6 m away?
3. Tarzan (80 kg) jumps out of a tree at 1.4 m/s and grabs the end of a 32 m vine suspended suspiciously horizontal 36 m above the forest floor. What will be his speed at the bottom of his swing 4 m above the ground.? (Think pendulum)
4. Evel Knievel (70 kg) fires up his rocket bike (280 kg) which provides 1500 N of force forward. He begins from rest and accelerates up to the edge of a cliff 200 m high 70 m away. At the edge of the cliff, Evel shuts off the rocket. What is Evel's speed at the bottom of the cliff?
5. I drop a 6 kg bowling ball from 1.5 m high and it only bounces up 0.8 m. How much energy is lost? Where did it go?
6. A Hooke's Law spring is compressed a distance  $d$  in order to launch a mass  $m$  vertically to a height  $h$  above the starting position. How far should the spring be compressed to launch the mass  $2h$  above the starting position?

Answers:

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|-------------|--|
| 1. 0 J      | 4. 67.8 m/s  |
| 2. 17.4 m/s | 5. 42 J, friction converted it into heat and sound |
| 3. 25.3 m/s | 6. $1.41 d$  |