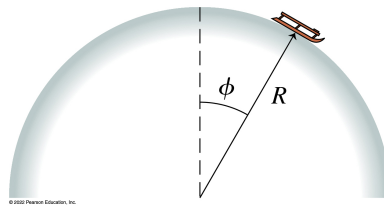
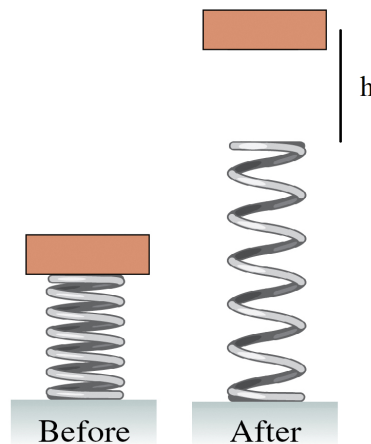


PHY151 Practical Questions for Oct 24 to 28

1. A force \vec{F} acts on an object wherever it is as: $\vec{F}(x, y) = y\hat{i} - x\hat{j}$. Find the work done by the force on the object when:
 - (a) The object goes ‘right’ along the x-axis from (0,0) to (1,0) in a straight line, then goes ‘up’ in a straight line from (1,0) to (1,1).
 - (b) The object goes ‘up’ along the y-axis from (0,0) to (0,1) in a straight line, then goes ‘right’ in a straight line from (0,1) to (1,1).
 - (c) Is this force conservative? Why or why not?
2. A sled is at the top of an icy hill (pictured below) is given a tiny push. At what angle does the sled “fly off” the hill?



3. Modelling question: What average force does a seatbelt apply to an adult person during a car crash? Note that a key safety feature of modern cars is that the front of the car is designed to crumple during a crash specifically so that the applied force of the seatbelt is reduced. Use work and energy considerations to solve this problem.
4. Data analysis question: A 2.0-kg-mass is placed on a vertical spring. The mass is then compressed further by hand for various distances, then released. The total compression distance (Δy) of the spring is recorded for each trial. The maximum height (h) of the mass (relative to the uncompressed spring's height) is measured for each trial. There's a diagram below of the situation. The data is presented below the diagram. What is the value of the spring constant?



Maximum height of a mass launched from a vertical spring

