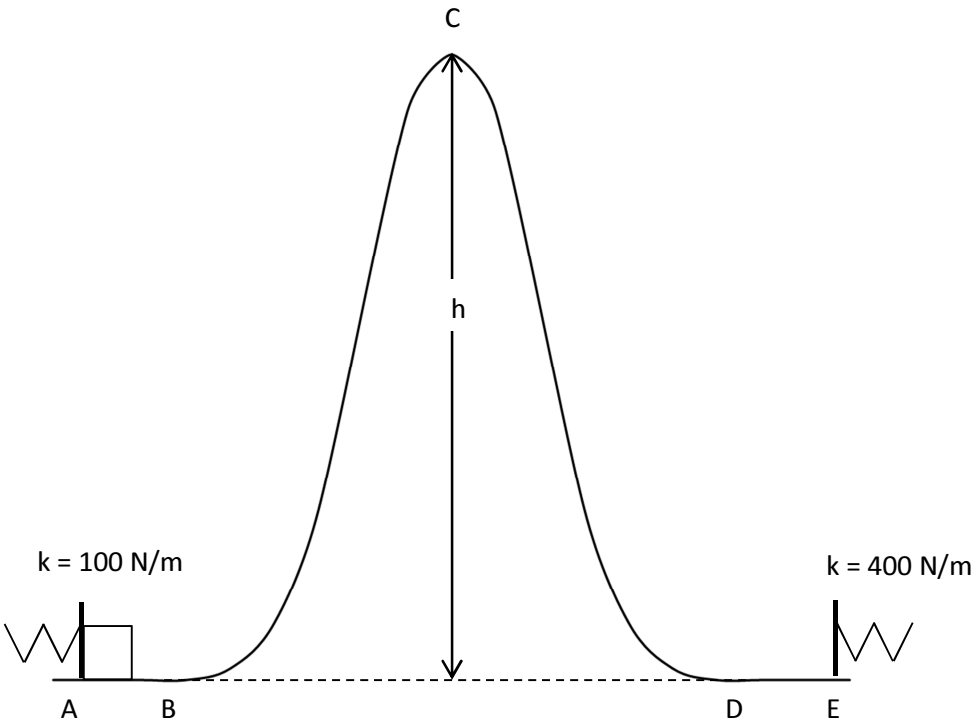
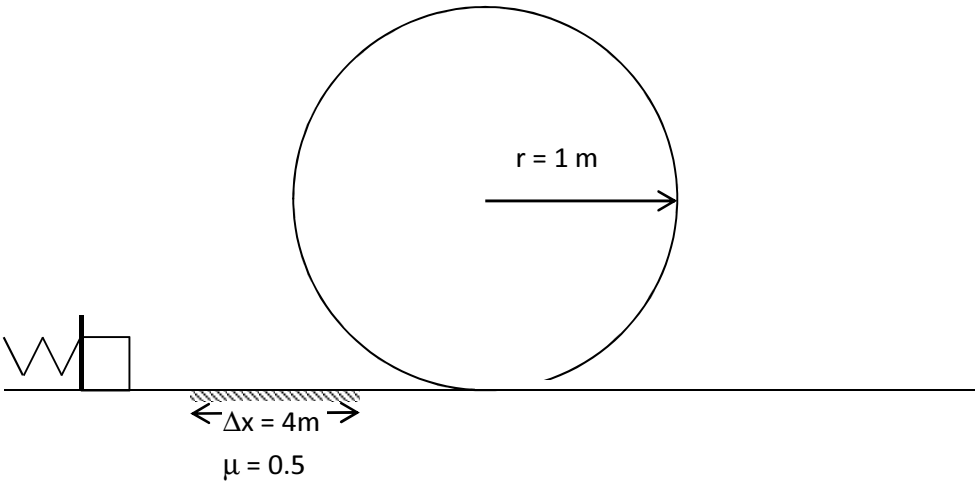
W6.13

1. A 4-kg mass starts at point A. It is released from rest after initially being held against a spring of k = 100 N/m which is compressed by 0.5 m. Consider the problem when h = 2 m and h = 0.2 m. All surfaces are frictionless.
   Determine:
   a. The total energy at each point
   b. The kinetic, spring potential and gravitational potential energy at each point
   c. The velocity at points B, C, and D
   d. The compression of the spring at point E



2. A spring is compressed 1 m from its unstretched position and launches a block of mass 2 kg over a patch of rough ground and then around a loop. Find the minimum spring constant so that the mass just completes the loop.



W6.13

Key:

1. For h = 2m, the block does not have enough energy to get over the hill. It will stop before point C and reverse direction (returning through point B to A).

For h = 0.2 m:

(J)	A	B	C	D	E
K	0	12.5	4.5	12.5	0
U_s	12.5	0	0	0	12.5
U_g	0	0	8	0	0
E	12.5	12.5	12.5	12.5	12.5
		v = 2.5 m/s	v = 1.5 m/s	v = 2.5 m/s	x = 0.25 m

2. k = 180 N/m