

R4

① Autumn has a mass of 50 kg, she is riding a skateboard traveling a 5 m/s. She rides into a dip of radius 25 meters. What is the upward force (normal force) on Autumn from her feet at the bottom of the dip?

② Autumn now goes over a hill that has a radius of 70 m at a speed of 10 m/s. What is the upward normal force?

③ Autumn approaches a hill that has a radius of 30 m. What is the fastest that Autumn can drive over the hill and not go airborne? (hint $F_N = 0$ when air borne).

④ Autumn approaches a flat plain. What is the normal force acting on Autumn?

5. The coefficient of static friction for a certain kind of pavement and tires is $\mu_s = .9$ when the pavement is dry, $\mu_s = .6$ when the pavement is wet, and $\mu_s = .3$ when the pavement is icy.

a) How fast can a 1000-kg car take a 60-m radius turn when the pavement is dry? Convert to mph.

b) How fast can a 4000-kg car take a 40-m radius turn when the pavement is dry? (Does the mass of the car affect the maximum speed?)

c) How fast can the car take a 80-m radius turn when the pavement is wet? Convert to mph.

d) How fast can the car take a 50 m radius turn when the pavement is icy? Convert to mph.