1. An object of mass M rests motionless on a ramp making an angle θ relative to the horizontal. The coefficient of static friction between the object and the ramp is μ_s. Draw a free body diagram for the object and determine the magnitudes of the forces in it.

2. For the object in the previous problem, determine the "angle of repose," which is defined as the angle at which the object will slip.

3. A small child goes for a walk on a windy day. The wind is *very* strong and the small child is lifted off her feet and blown into a wall. She is pinned to the wall by the wind. If the child has a mass of 25 kg and the coefficient of static friction between the child and the wall is 0.35, draw a free body diagram for the child and determine the force that the wind exerts on her.

4. A tightrope is suspended over a chasm. A man with a mass of 80 kg is walking along the tightrope. When the man is in the exact middle of the rope, it is found that the rope makes an angle of 17° relative to the horizontal. What is the magnitude of the tension in the rope?

5. A Physics professor twirls a ball with a mass of 100 grams over his head at the end of a string with a length of 1.5 meters in a perfect circle. By observation, it is found that the time it takes for the ball to make one revolution is 2 seconds. What is the speed of the ball?