1. **CATCH ON A MERRY-GO-ROUND**
   
   (a) There is a rotating chair with a flat platform in the Paradigms study room (Wngr 304F). Start the chair/platform going counterclockwise, and attempt the following:
   
   Roll the ball to a person standing beside the chair/table.
   Roll the ball between your left and right hands in the radial direction.
   Roll the ball between your left and right hands in the direction perpendicular to the radial direction.
   
   Describe in a few sentences what happens in each case. You may wish to include sketches from the point of view of observers on the ground and/or on the rotating platform.
   
   (b) Estimate the values of \( \vec{\Omega}, \vec{r}, \) and \( \vec{v} \) in at least one case, and use these numbers to calculate the expected Coriolis deflection. Does your answer agree qualitatively with what you observed?

2. **CORIOLIS DRIFT**

   In McDonald’s article (see syllabus), it is stated that, in the absence of friction, a car moving at 60 mph would undergo a Coriolis drift to the right of roughly 15 feet after traveling 1 mile, and that a person walking at 4 mph would similarly undergo a Coriolis drift of roughly 250 feet after 1 mile.

   *You do not actually need to read McDonald’s article in order to do this problem.*

   (a) Verify that these claims are the correct order of magnitude, assuming a latitude of 45°.

   (b) Explain briefly why the effect is larger for the pedestrian than for the car.

3. **I FEEL THE EARTH MOVE UNDER MY FEET ...**

   (a) Work through the discussion in §9.8 of Taylor, which derives the deflection due to the Coriolis force of an object falling “straight” down. (You can reasonably assume that \( \dot{x} \) and \( \dot{y} \) are small compared to \( \dot{z} \), which further simplifies the analysis.)

   *You do not need to turn anything in for this part of the problem.*

   (b) Do Problem 9.29a on page 364 in Taylor, which requires a similar computation for an object thrown “straight” up from the ground.

   *It should not be that difficult to solve this problem from scratch, that is, without first doing Problem 9.26. Alternatively, do that problem first. You may again reasonably assume that the horizontal speeds are small compared to the vertical speed. If you’re stuck, go ahead and use Equation (9.73) without first doing Problem 9.26.*

   (c) The object dropped from a height winds up to the *East* of where it starts, whereas the object thrown up from the ground winds up to the *West*. Briefly (1–2 sentences; no equations) explain why.

   *Make sure your calculations support this sign difference!*