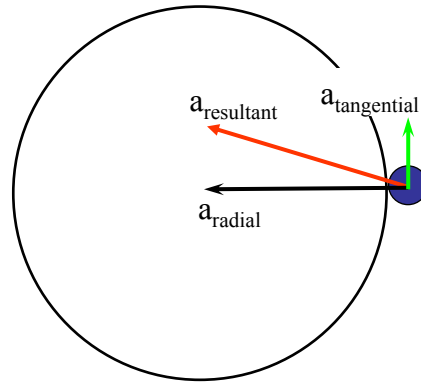


Radial Forces

- Remember: objects must be forced to follow a curved path
- Two forces play a role in radial acceleration (action-reaction pair)
 - Centripetal force
 - Centrifugal force



- Centripetal force: “center seeking” force
 - force that causes radial acceleration
 - directed in toward center of rotation (along radius)
- Examples:
 - Speed skater cornering
 - Source of centripetal force?
 - Friction between ice and blades
 - What happens if skater falls around corner?
 - Centripetal force is removed and skater travels along path which is tangent to curve.
 - Rotating hammer thrower
 - Source of centripetal force?
 - What happens to the hammer at release?

- Centrifugal force: “center fleeing” force
 - reaction force to centripetal force
 - directed out away from center of rotation (along radius)
- Examples:
 - Speed skater cornering
 - Source: Feeling of being “pushed” outward
 - Rotating hammer thrower
 - Source: Feeling the “outward pull” of the hammer on the cable and body
 - Spinning rides at amusement parks
 - Source: Feeling of being “pushed” outward

IMPORTANT

- Centrifugal forces arise as a reaction to centripetal forces. Centrifugal forces are sometimes referred to as “fictitious” forces because there appears to be no physical source of the force.
 - Example: spinning amusement ride
 - Feeling of being pushed outward
 - What is behind this feeling? (i.e., what is forcing you outward?)

The “Human Centrifuge” is a carnival ride that spins its helpless (and perhaps deranged) victims around and around. At a certain point in the ride, the floor drops out but the riders stay fixed to their original positions on the containing (side) wall. Draw and label the *three* forces that act *on the rider* shown in the figure below. Also, briefly explain why the rider does not fall to the bottom of the ride when the floor drops out.

