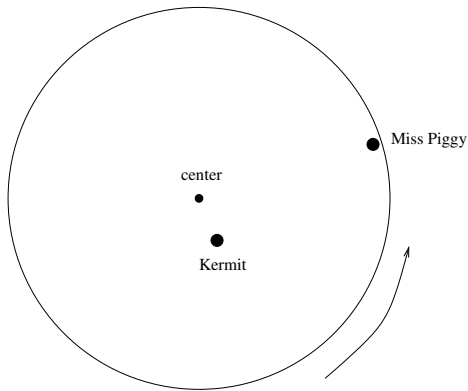


Supplementary Problem VII for Physics 6 (from an old exam)

Bernice takes Rupert to the park along with his favorite stuffed animals, Kermit the frog and Miss Piggy. Rupert places Miss Piggy on the edge of the merry-go-round and Kermit near the center:



He pushes the merry-go-round so that it rotates counterclockwise at a constant rate. Miss Piggy and Kermit remain seated on the merry-go-round as it turns.

- a) (i) Is Kermit's linear (tangential) speed v_t greater than, less than, or the same as Miss Piggy's?
- (ii) On the picture above, draw two vectors, showing \vec{v}_t for each animal at the given moment.
- (iii) Is Kermit's angular speed ω greater than, less than, or the same as Miss Piggy's?
- (iv) What is the direction of Kermit's angular velocity vector $\vec{\omega}$ at the instant shown? (You may explain the direction in words or draw a diagram, or both.)
- b) (i) Miss Piggy and Kermit have the same mass. As the merry-go-round continues to rotate at a constant rate, is the magnitude of the net force on Miss Piggy greater than, less than, or the same as the magnitude of the net force on Kermit? Explain how you know.
- (ii) On the diagram above, draw and label arrows to show the direction of the net force on each animal at the given moment. (The rate of rotation is still constant.)
- (ii) What is the physical cause of these net forces? (i.e., what object or objects exert(s) the force(s), and what type(s) of forces is/are involved?)