

$$F_c = \frac{mv^2}{r}$$

3. Which factor, when doubled, would produce the greatest change in the magnitude of the centripetal force acting on a cart? (1) mass of the cart (2) radius of curvature of the path (3) velocity of the cart (4) weight of the cart
4. A force of 20.0 N is required to keep a 4.00 kg rubber stopper swirling around in a circle with a radius of 0.500 m.

A) Calculate the magnitude of its acceleration.

$$F_c = mac$$

$$a_c = \frac{F_c}{m} = \frac{20\text{N}}{4\text{kg}} = 5\text{m/s}^2$$

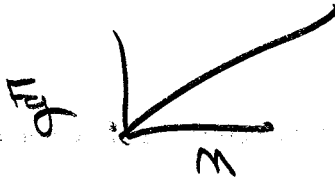
B) Calculate the magnitude of its circular speed.

$$a_c = \frac{v^2}{r} \rightarrow v = \sqrt{a_c r}$$

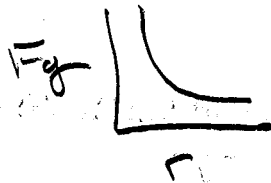
$$= \sqrt{(5\text{m/s}^2)(0.5\text{m})} = 1.58\text{m/s}$$

Gravitational Force

5. Sketch the relationship between gravitational force and mass on a graph. (gravitational force on y-axis and mass on x-axis)



6. Sketch the relationship between gravitational force and separation distance between two masses on a graph. (gravitational force on y-axis and separation distance on x-axis)



7. When a satellite is a distance d from the center of Earth, the gravitational force of attraction between the satellite and Earth is F . What is the gravitational force of attraction between the satellite and Earth when the satellite's distance from the center is $3d$?

$$F_g = \frac{Gmm}{r^2}$$

$$= \frac{Gmm}{(3)^2}$$

$$= \frac{1}{9}$$