Part C: Relationship Between Angular and Linear velocity

Angular velocity shows how fast something moves in a circle.

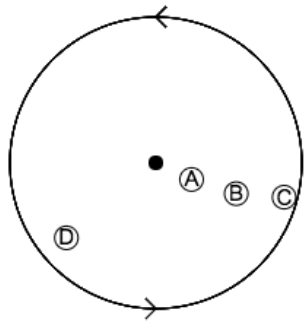
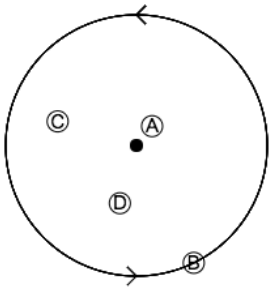
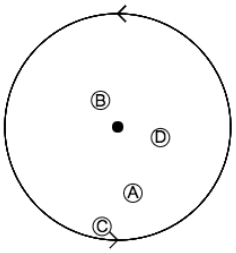
Linear velocity is just the "normal" version of velocity. Something with a faster linear velocity moves faster, period:

Rigid Body An item that keeps its shape while rotating. [we will only deal with rigid bodies rotating in this class!]

Linear and Angular Velocities The linear velocity of a point on a rigid body is given by the formula: $$v = r\omega$$ In which *v* is linear velocity, *r* is the radius at that point, and ω is the angular velocity of the spinning item.
Very Important Point Something that is *farther* from the center of a rotating circle has the same angular velocity but a *higher* linear velocity!

Each of the following pictures represents an disc spinning in a circle. Each contains four points labeled A, B, C, and D. The four points are moving at four different speeds. For each spinning disc, rank the four points by which point is moving the fastest.

Spinning Disc	Fastest point	Second Fastest	Third Fastest	Slowest point

A bicycle tire has a radius of 0.35 meters. It is rotating at a speed of 120 rpm. What is the linear speed of the rubber on the farthest point out?
a) convert the angular speed into SI units of radians per second

b) use the formula above to determine the linear velocity

Someone has an arm that is 0.85 meters long, and is spinning at a rate of 2.4 seconds per revolution. What is the linear speed of their fingers?
a) convert the angular speed to Si units of radians per second

b) use the formula above to determine the linear velocity

Written Question 2:
When pitching, proper mechanics are to hold out your arm and extend your arm as you release the football. Give one reason why extending your arm will increase the velocity of a ball using this formula: