Problem 3
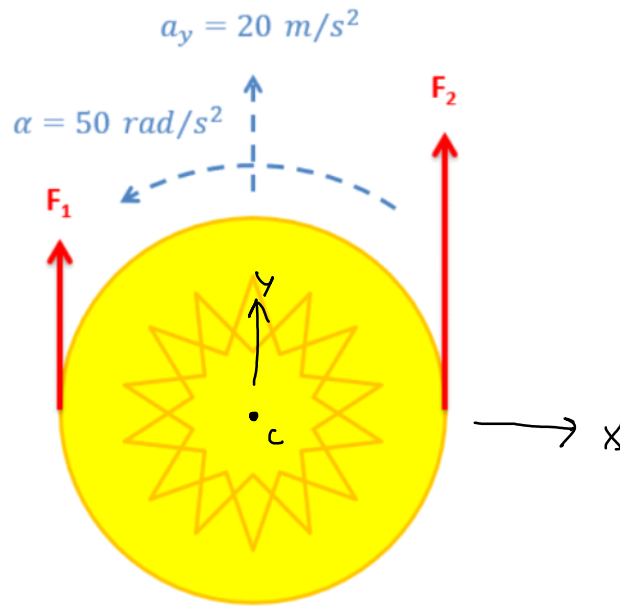
You are designing a Frisbee launcher to launch a 40 cm diameter, .6 kg
Frisbee that can be modeled as flat circular disc If you want the Frisbee
to have a linear acceleration of 20 m/s² and an angular acceleration of 50
rad/s² as shown to the right, what should F1 and F2 be?

$$a_y = 20 \ m/s^2$$

F_2

$$\alpha = 50 \ rad/s^2$$

F_1

y

c

x

$$\Sigma F_y = F_1 + F_2 = (.6 \, kg)(20 \, m/s^2)$$

$$\Sigma M_c = -.2m(F_1) + .2m(F_2) = \frac{1}{2}(.6 \, kg)(.2m)^2(50 \, rad/s^2)$$

$$F_1 = 12 - F_2$$

$$-.2(12 - F_2) + .2F_2 = .6$$

$$.4F_2 - 2.4 = .6$$

$$\boxed{F_2 = 7.5 \, N}$$

$$\boxed{F_1 = 4.5 \, N}$$