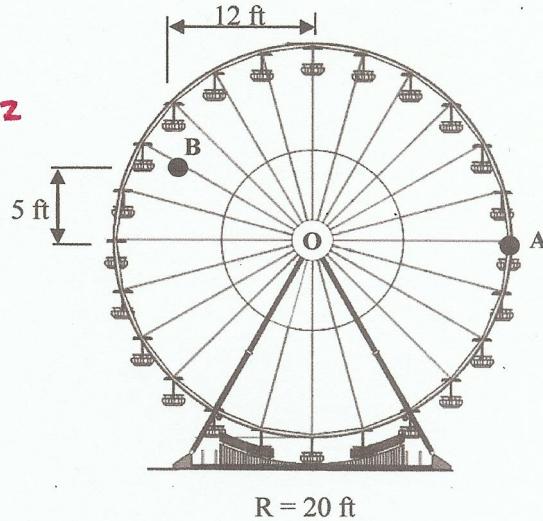
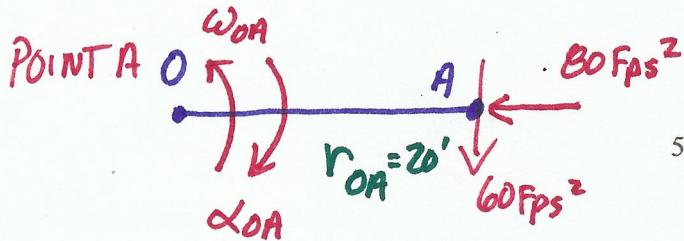


Rigid Body Kinematics I – Problem 1

The Ferris Wheel shown rotates counterclockwise about point O such that at a given instant the acceleration of point A is $a_A = -80i - 60j \text{ fps}^2$. At this instant, what are the tangential and normal components of the acceleration of point B ? What is the velocity of point B ?

CLASSIFY MOTION - RRAFA



$$a_N = \omega_{OA}^2 r_{OA}$$

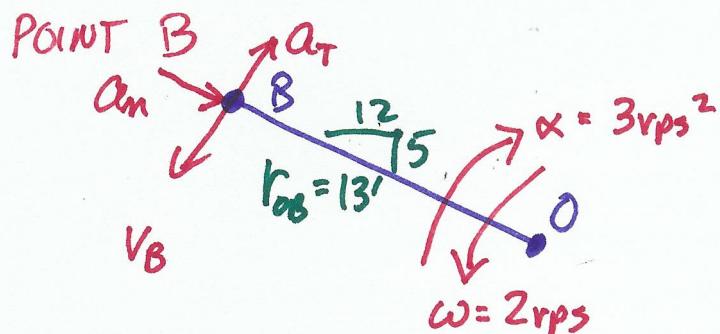
$$80 \text{ Fps}^2 = \omega_{OA}^2 (20')$$

$$\omega_{OA} = 2 \text{ rps}$$

$$a_T = \alpha_{OA} r_{OA}$$

$$60 = \alpha_{OA} (20')$$

$$\alpha_{OA} = 3 \text{ rps}^2$$



$$V_B = \omega_{OA} r_{OB} = (2 \text{ rps})(13') = 26 \text{ Fps}$$

$$a_T = \alpha_{OA} r_{OB} = (3)(13) = 39 \text{ Fps}^2$$

$$a_N = \omega_{OA}^2 r_{OB} = (2)^2(13) = 52 \text{ Fps}^2$$

$$V_B = 26 \text{ Fps} \quad \triangleleft \frac{12}{5}$$

$$a_{T_B} = 39 \text{ Fps}^2 \quad \triangleleft \frac{12}{5}$$

$$a_{N_B} = 52 \text{ Fps}^2 \quad \triangleleft \frac{5}{12}$$