HW15a

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1.

$$\vec{F}_{avg} = \frac{\vec{J}}{\Delta t} = \frac{m(v_f \cos\theta + m v_i)\hat{i} + m v_f \sin\theta \hat{j}}{\Delta t}$$

2: $$V_G = \sqrt{\left(\frac{1}{2}\frac{m}{M} V \sin\theta\right)^2 + \left(V - \frac{1}{2}\frac{m}{M} V\cos\theta\right)^2}$$

$$\vec{J} = \frac{1}{2} mv \left(\sin\theta \hat{i} + \cos\theta \hat{j}\right)$$

3. $$V_i = \frac{mv}{m+M}\left(\cos\theta + \sin\theta \cot\varphi\right)$$

4. $$\phi = \arctan\left(\frac{V_B \sin\theta}{3V + V_A + V_B \cos\theta}\right)$$