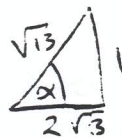
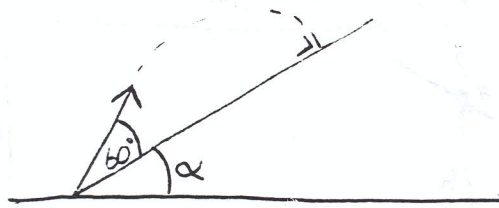


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$$\tan \alpha = \frac{1}{2\sqrt{3}}$$

$$\cos \alpha = \frac{2\sqrt{3}}{\sqrt{13}}$$

$$\sin \alpha = \frac{1}{\sqrt{13}}$$

$$\vec{u} = u \cos 60^\circ \vec{i} + u \sin 60^\circ \vec{j}$$

$$\vec{g} = -g \sin \alpha \vec{i} - g \cos \alpha \vec{j}$$

$$\vec{v} = (u \cos 60^\circ - g \sin \alpha t) \vec{i} + (u \sin 60^\circ - g \cos \alpha t) \vec{j}$$

$$\vec{R} = \left(u \cos 60^\circ t - \frac{g}{2} \sin \alpha t^2 \right) \vec{i} + \left(u \sin 60^\circ t - \frac{g}{2} \cos \alpha t^2 \right) \vec{j}$$

when particle strikes plane $R(t) \vec{j} = 0$

$$\frac{u\sqrt{3}}{2} t - \frac{g}{2} \frac{2\sqrt{3}}{\sqrt{13}} t^2 = 0$$

$$t=0 \text{ OR } \frac{u\sqrt{3}}{2} - \frac{g}{2} \frac{2\sqrt{3}}{\sqrt{13}} t = 0$$

$$\frac{u\sqrt{3}}{2} = \frac{g}{2} \frac{2\sqrt{3}}{\sqrt{13}} t$$

$$\frac{u\sqrt{3}\sqrt{3}}{2\sqrt{3}g} = t \quad \therefore t = \frac{\sqrt{3}u}{2g}$$

$$\vec{v}(t) \vec{j} = 0 \quad ?$$

$$\frac{u}{2} - \frac{g}{\sqrt{13}} \left(\frac{\sqrt{3}u}{2g} \right)$$

$$\frac{u}{2} - \frac{u}{2} = 0$$

$$\therefore \frac{u}{2} \vec{i} + u \frac{\sqrt{3}}{2} \vec{j}$$

$$\vec{v}(t) = 0 \vec{i} + \left[\frac{u\sqrt{3}}{2} - \frac{g}{2} \frac{2\sqrt{3}}{\sqrt{13}} \left(\frac{u\sqrt{3}}{2g} \right) \right] \vec{j}$$

$$= 0 \vec{i} + \left(\frac{u\sqrt{3}}{2} - g \frac{2\sqrt{3}}{\sqrt{13}} \left(\frac{u\sqrt{3}}{2g} \right) \right) \vec{j}$$

$$= \left(\frac{u\sqrt{3}}{2} - \frac{u\sqrt{3}}{1} \right) \vec{j}$$

$$= 0 \vec{i} - \frac{u\sqrt{3}}{2} \vec{j}$$

$$m_1 u_1 + m_2 u_2 = (m_1 + m_2) v$$

$$v_1 - v_2 = -e(u_1 - u_2)$$