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**Exercise 2.1.** Find the acceleration of all masses.

**Solution:** Using equivalent inertial frames approach...  
Using Center of Mass approach...

**Exercise 2.2.** Find the acceleration of the masses.

**Solution:**

**Exercise 2.3.** Find the angle and the speed at which the particle breaks off from the hemisphere

**Solution:**

**Exercise 2.4.** Obtain short-time and long-time behaviours for  $v_y(t)$  and  $y(t)$ .

**Solution:**