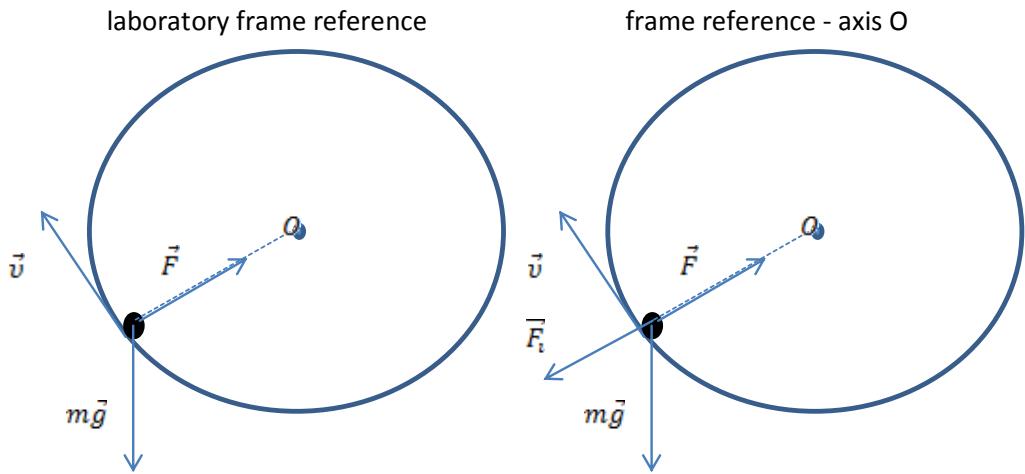


**Problem:**

What are forces, acting on body in vertical circular motion.

**Solution:**

Let's consider some body, moving in vertical circle.



Forces, acting on this body depends on the frame of reference, that we consider motion in.

In laboratory frame reference (or frame reference - Earth) forces are:

$F$  – normal reaction of the surface of the circle;

$mg$  – gravitational force;

If to consider frame reference – axis O (perpendicular to the figure above), which rotate with angular speed  $\omega = \frac{v}{R}$  ( $R$  – radius of the circle,  $v$  – velocity of body), situation change. This frame reference is not inertial. Thus, new force appear – inertial force equal to  $\vec{F}_i = m\vec{a}$ , where  $\vec{a}$  – centripetal acceleration of the body ( $a = \frac{v^2}{R}$ ).

Thus, in frame reference - axis O, forces are:

$F$  – normal reaction of the surface of the circle;

$mg$  – gravitational force;

$\vec{F}_i$  – inertial force;