Answer on Question #78094 Physics / Other

Two objects move on the same circular trajectory of radius R = 1m with constant angular speed in opposed

directions (one clockwise, the other anticlockwise). The angular speed magnitude of the first object is one third

of the other. At time t=0 they are in the same position.

(a) Calculate the time tm when the two objects meet again the first time.

(b) Calculate the position where the two objects meed again the first time.

(c) Calculate the magnitude of accelerations of the two objects.

Solution:

(a) The total path of the objects

$$2\pi = \omega t + \frac{1}{3}\omega t$$

$$t = \frac{3\pi}{2\omega}$$

(b) The position

$$\varphi = \omega t = \omega \times \frac{3\pi}{2\omega} = \frac{3\pi}{2}$$

(c) The magnitude of acceleration

$$a_1 = \omega_1^2 R = \omega^2 R$$

$$a_2 = \omega_2^2 R = \frac{1}{9}\omega^2 R$$