Answer on Question 49906, Physics, Other

Question:

A 3 kg ball is traveling in a circle of radius 2 meters with a tangential velocity of 2 meters/second. Find the centripetal acceleration of the ball and the centripetal force acting on it.

Solution:

By the definition of the centripetal acceleration we have:

$$a_c = \frac{v^2}{R} = \frac{\left(2\frac{m}{s}\right)^2}{2m} = 2\frac{m}{s^2}.$$

As we know the centripetal acceleration we can use the Newton's second law of motion to find the centripetal force acting on a ball:

$$F_c = ma_c = 3kg \cdot 2\frac{m}{s^2} = 6N.$$

Answer:

a) $a_c = 2\frac{m}{s^2}.$

b) $F_c = 6N.$