HW3-7 Soln)

So, we don't want the water to lose contact with the bucket, or rather, we want the contact to just go to zero. At that point, the water is in free-fall and its acceleration will be  $10 \text{ m/s}^2$  downward, toward the center of the circle.

We are asked for revolutions per second, so we want to find  $\boldsymbol{\omega}.$ 

$$a_{\rm C} = \omega^2 r$$
  
 $\omega = \sqrt{\frac{a_{\rm C}}{r}} = \sqrt{\frac{10}{0.8}} = 3.54 \text{ radians/sec}$ 

But we were asked for revolutions per second, so convert:

$$\frac{3.54 \text{ radians}}{\text{second}} \times \frac{1 \text{ revolution}}{2\pi \text{ radians}} = \frac{0.56 \text{ revolutions/second}}{1000 \text{ revolutions/second}}$$

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