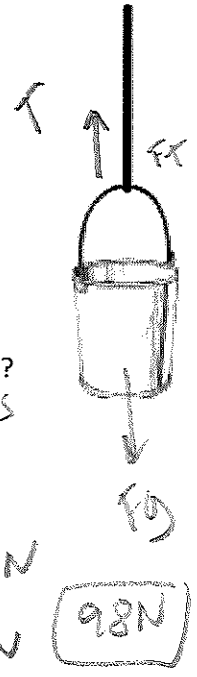


Class Practice
Rotational Force Centripetal

1. A 5kg bucket of water is being held by a 1.5m rope.
- Draw the forces on this system.

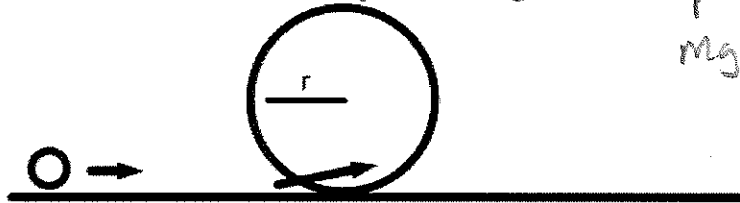


- What is the tension on the rope while it hangs? $49N$
- If the rope/bucket is swung around a vertical circle what is the minimum speed?
- What is the tension on the rope at the top?

$v_t = \sqrt{rg} = 3.8 \text{ m/s}$

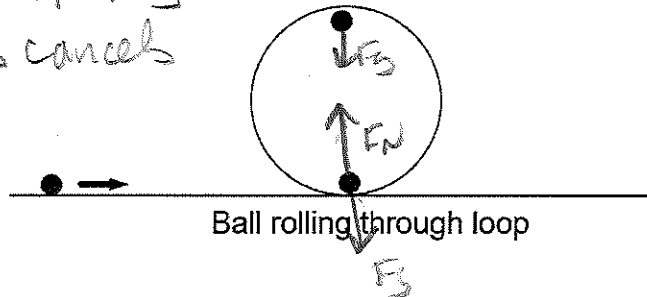
- What is the tension on the rope as it swings through the bottom?

$-F_g + F_t = \Sigma F_c$ | $F_c + F_g = T$ | $\frac{Mv_t^2}{r} = F_c = 49N$
 $Mg = F_g = 49N$



2. A 10kg ball and a 20kg ball are rolled toward a 30cm loop as seen here. The 20kg ball needs to be rolled twice as fast as the 10kg ball. Justify or nullify this statement.

$F_c = F_g$ | $v_t = \sqrt{rg}$
 mass cancels



3. The 10kg ball rolls through the 30cm loop at the minimum speed to make the loop.
- Sketch the ball at the bottom and at the top, add the forces.

Note: $F_N > F_g$

- What is the force normal as it rolls through the bottom?
greater than gravity
- What is the force normal at the top? ?
zero, less than gravity
- How fast is the ball going at the top?

$v_t = \sqrt{rg}$ | $\sqrt{10 \cdot 3} = 5.4 \text{ m/s}$

- What is the tension on the rope as it swings through the bottom?

F_c will increase?