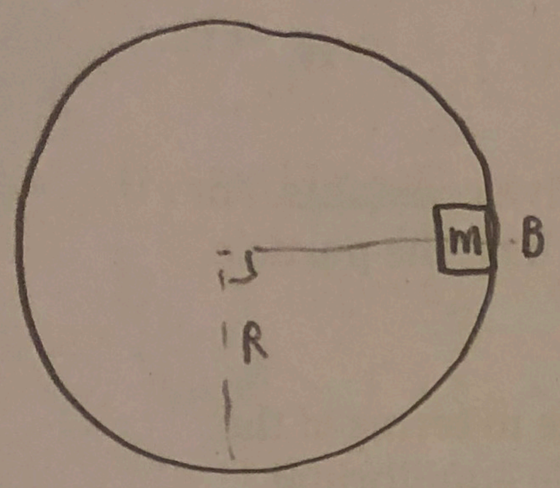
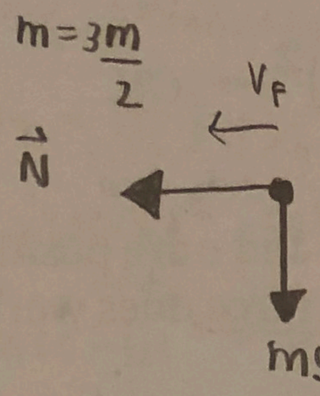
Part C (10 points): After the collision described in Part B, what is the magnitude of the normal force exerted by the loop onto the two stuck-together blocks as they pass Point B, located 90° up the loop with respect to the vertical? Express your answer in terms of m and g.





Conservation of Energy:

$$K_i + U_i^{0} = K_f + U_f$$

$$\frac{1}{2}mv_i^2 = \frac{1}{2}mv_f^2 + mgh \qquad m = \frac{3m}{2}$$

$$\frac{1}{2}\left(3\sqrt{5Rg}\right)^2 = \frac{1}{2}mv_f^2 + gR$$

$$v_f^2 = \left(\frac{5Rg}{2} - Rg\right) \times 2 = 3Rg \quad \frac{m}{s}$$

$F_{net,x} = ma_{rad} = |\vec{N}|$ $\qquad m = \frac{3}{2}m$

$$\frac{mv_f^2}{R} = |\vec{N}| = \frac{m(3Rg)}{R} = 3mg$$

$|\vec{N}| = 3mg$ N.

E mech is not conserved.

$\Delta E_{mech} = W_{other} = W_N$

$$|\vec{N}| = \frac{3mv_f^2}{2R}$$

$$|\vec{N}| = \frac{3mv_f^2}{2R} = \frac{3m(3Rg)}{2R} = \frac{9mg}{2}$$

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