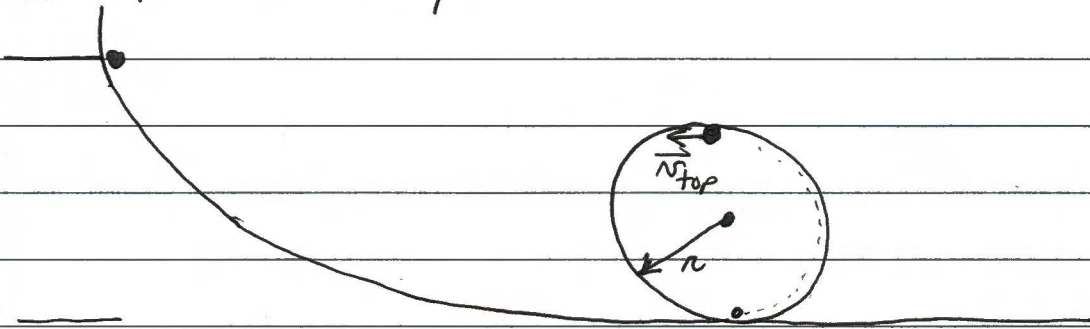
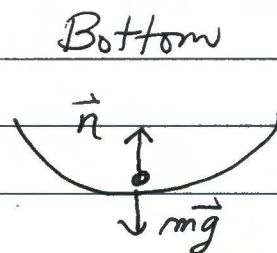
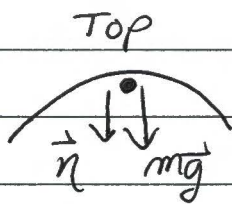


Loop-the-Loop



Q: at the top of the loop, what is the minimum v needed to just barely stay on track.



Apply Newton's 2nd Law, call up positive
at top: $\Sigma F = ma$

$$-n - mg = m(-v^2/r)$$

$$n + mg = mv^2/r$$

just barely stays on track $\Rightarrow n \rightarrow 0$

$$mg = mv^2/r \Rightarrow v_{top} = \sqrt{rg}$$

$$R = 21.5 \text{ cm} = 0.215 \text{ m}$$

$$v_{top} = \sqrt{(0.215 \text{ m})(9.8 \text{ m/s}^2)} = 1.45 \text{ m/s}$$