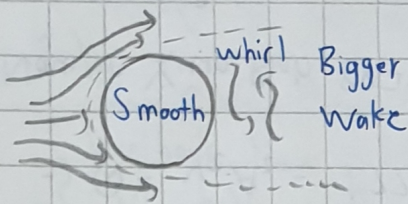


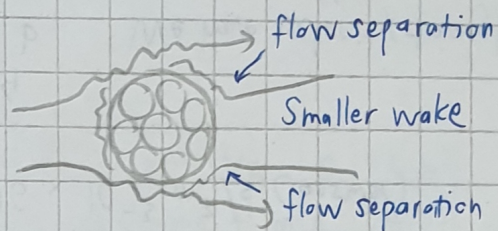
Exercise 5

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Golf is the game where players hit the ball as far as possible \Rightarrow The goal of the design is to reduce drag force of the air acting on the ball. Assume that all of golf games are played in windless air \Rightarrow when the ball is hit, the flow around the golf ball should be laminar. We consider 2 cases when the ball is smooth and when it has dimples.



As the laminar boundary layer wraps over the ball, the air will travel smoothly and separates the ball from the wake region behind it. This wake region has great influence as it becomes turbulent with unsteady wind whirled that increases drag on the ball.



\Rightarrow That's why there are dimples to make the golf ball more blunt. The dimples will create tiny air flows that causes disturbances on the boundary layer, making it more turbulent and results in flow separation further back.

\Rightarrow Minimizing the wake area and decrease drag force.