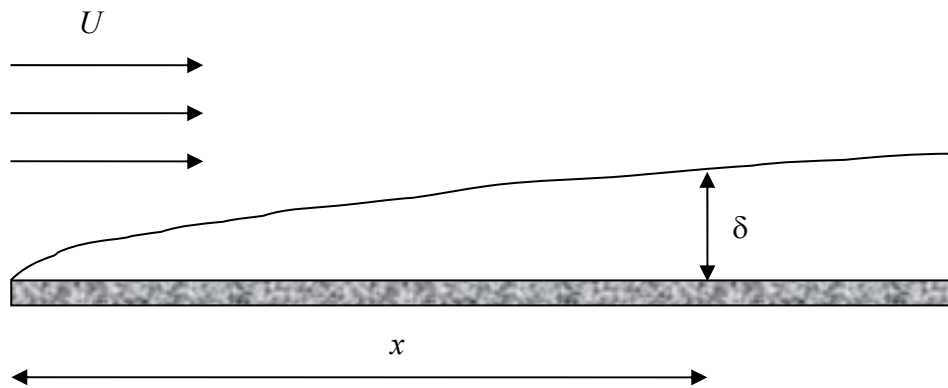


1. Dimensional analysis of skin friction on a flat plate: Consider a uniform flow (U) over a flat plate as follow:



- a) List the relevant physical variables which are pertinent to the determination of skin friction on a flat plate at a downstream distance, x , measured from the leading edge.
- b) Perform a dimensional analysis on your results in Part (a).

2. Drag on a cylinder due to a cross-flow in open air: In an experiment to determine the drag on a cylinder due to a uniform cross-flow U , a circular cylinder of diameter d was immersed in a steady, two-dimensional incompressible flow in open air. Measurements of velocity and pressure were made at the boundaries of a fixed control volume shown below. The pressure was uniform over the entire control surface. The streamwise velocity component is indicated in the following figure. Based on the measured data, determine the drag coefficient on the cylinder (based on the projected frontal area.)

