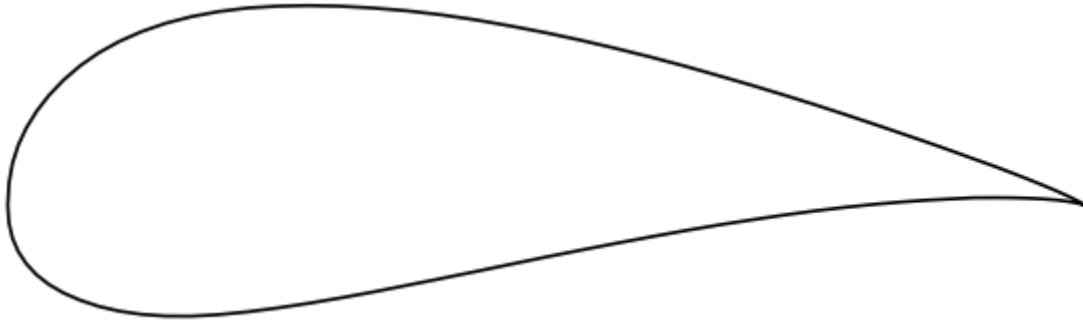# AEM 313 Problem Set #4

Due: 23rd September 2016 by 5:00pm

1. For the FX 69-PR281 given below, use the Joukowski airfoil theory (Lesson 11) to estimate:

- The zero lift angle of attack. $\alpha_{zl} = \alpha\left(C_l = 0\right) =$

- The lift coefficient at zero angle of attack ("Cee Ell Nought"). $C_{lo} = C_l\left(\alpha = 0\right) =$

- The slope of the lift curve ("Cee Ell Alpha"). $C_{l\alpha} = \dfrac{dC_l}{d\alpha} =$

- The quarter chord moment coefficient ("Cee Em quarter chord"). $C_{m\frac{c}{4}} =$

2. A spinning cylinder of radius 2 inches and span of 24 inches is generating 20 lbf of lift in a 100 ft/s flow at SSL.
   - Determine the equivalent streamfunction (composed of a freestream, doublet and vortex). $\psi\left(r,\theta\right) =$
   - Plot 5 or more relevant streamlines.