AE 360
Homework 5
Due: Thursday, 13 February 1997, in class
Read: Anderson, Chapter 2, Chapter 3

1. Given $A(x)$, τ_w, q_w, and $e(P, \rho)$, write a general mathematica code which will integrate Eqs. 4.107-4.109 from the course notes. You will use this code in future homeworks. If calorically perfect ideal air enters the diverging section of a frictionless adiabatic wind tunnel at $T = 300\ K$, $P = 1\ MPa$, $u = 500\ m/s$ and $A(x) = 1.3\ m^2 + (2.0\ m)x$, use your code to generate computer plots of $\rho(x), u(x), P(x)$ for $0.0\ m < x < 1.0\ m$ Also plot $\rho u A$, $h + u^2/2$, and P/ρ^γ as functions of x.

2. Anderson: 3.1, p. 98

3. Anderson: 3.2, p. 98

4. Anderson: 3.3, p. 98

5. Anderson: 3.12, p. 99; use your code to solve this problem; give a computer plot of $u(x)$ and $M(x)$ for the flow. In this problem you can specify "initial" conditions at $x = 40\ m$ and integrate backwards in distance.

6. Anderson: 3.15, p. 99