

# Homework II: AE302, High-speed Aerodynamics

Feb. 6 2007

Due: Feb. 13, 2008(beginning of class)

## Problem 1

Problem 7.9, 7.10, 7.11 (Answers in SI units)

## Problem 2

Consider a stream tube (1 dimensional) with variable cross section. Air flows through the tube. The flow is steady and adiabatic. At one side of the stream tube the following conditions are given:  $A_1 = 0.5m^2$ ,  $Ma_1 = 3$ . At the other side the following conditions are given:  $p_{t2} = 1.015 \cdot 10^5 N/m^2$ ,  $T_{t2} = 280K$ ,  $p_2 = 1.007 \cdot 10^5 N/m^2$  and  $A_2 = 0.5m^2$ . What is the direction of the flow ? (a) 1-> 2 or (b) 2->1. Explain your answer.