1. Write a code or use Excel to plot accurately a shock polar (pressure/flow angle diagram) for a given upstream condition. Similarly write a code to plot a pressure/flow angle diagram for a Prandtl-Meyer expansion. Apply these codes together to represent the states obtained for Problem #1 of the Mid-Term exam.

2. Text problem 4.9. Include also a pressure/flow angle diagram.

3. Text problem 4.8. Include also a pressure/flow angle diagram.

4. Consider an oblique shock incident on a slip plane dividing regions 1 and 2 as shown in the figure. These regions have different Mach numbers but the same pressures and stagnation temperatures. Assuming that $M_1 = 2.0$, $M_2 = 1.9$, $\Theta_A = 10^\circ$, determine $\Theta_B$, $\Theta_C$, $\Phi_5$, $M_A$, $M_5$.

5. Derive the expression in the notes/text relating the Mach number of a reflected shock to that of the incipient shock in the shock tube problem.