The rear fuselage of a supersonic jet has a 5° expansion corner as shown. The jet is flying at supersonic speed, such that the Mach number is $M_1 = 1.1$ just before the corner. The objective is to determine the size and shape of the shaded region in the flow, which has the highest Mach number and hence the lowest temperature, and is therefore the most likely to have condensation.

a) Determine the Mach number M_2 after the corner.

b) Determine the angles ϕ_1 of the last Mach line in the expansion fan, and the angle ϕ_2 of the following oblique shock. Note that ϕ_1 and ϕ_2 are measured relative to level.

c) Determine the height ratio h/l, and make an accurate sketch of the most-likely condensation region. Note: The figure is a cartoon, and the angles and shape shown are not accurate.