

Quiz 1 solution:

1. ~~The~~ Aircraft 1 will arrive first: the lower density of the air at high altitude is such that its airspeed will be same as that of ~~the~~ Aircraft 2, resulting in faster ground speed

2. The two aircraft ~~it~~ will satisfy

$$\frac{1}{2} \rho_1 V_1^2 = \frac{1}{2} \rho_2 V_2^2$$

$$\text{or; } V_1 = V_2 \sqrt{\frac{\rho_2}{\rho_1}} \quad \text{or} \quad \frac{V_1}{V_2} = \sqrt{\frac{\rho_2}{\rho_1}} = 1.22$$

From available tables: ~~at~~ $\rho_2 = 2.24 \cdot 10^{-3} \text{ slug/ft}^{-3}$

$$\rho_1 \approx 1.4962 \cdot 10^{-3} \text{ slug/ft}^{-3}$$

So the V_1 will be $\approx 22\%$ faster than V_2