WORKSHOP 1·12

Handout #3

From the first two parts of the workshop we know that $nR \approx 197162$ and, at an altitude of $h = 10000$m, the temperature and pressure are $T(10000) \approx 240.60$K and $P(10000) \approx 26430$Pa, and the rates of change of temperature and pressure with respect to altitude are $T'(10000) \approx -0.00154$K/m and $P'(10000) \approx -4.047$Pa/m.

Question #1: How quickly is the volume of your blimp changing with respect to altitude when you're at an altitude of $h = 10000$m?

You've constructed your blimp and you're ready for adventure. You leave Vancouver on a calm day so that your altitude as a function of time t (in min) is given by

$$h(t) = \alpha \cdot (1 - e^{-t/\beta}),$$

where $\alpha = 38778$ and $\beta = 1000$.

Question #2: How quickly is the volume of your blimp changing with respect to time when you're at an altitude of $h = 10000$m?