1. A parcel has properties $T$, $p$, and RH. Calculate $e$, $e_s$, $w$, and $T_d$.

   **Solution:** Use the definitions of these quantities given in the *Notes on Thermodynamics*. The procedure is described in problems 5 and 6 in *Example Problems: Thermodynamic Processes*.

2. A parcel rises adiabatically from $p_1$ to $p_2$. Calculate RH, $e$, $e_s$, $w$, $w_s$, $T$, $T_d$, and $\theta$ at $p_2$.

   **Solution:**
   
   (a) Because the process is adiabatic,
   
   \[ \theta(p_2) = \theta(p_1) \text{ and } w(p_2) = w(p_1). \]
   
   (b) Obtain $T(p_2)$ using
   
   \[ T(p_2) = \theta \left( \frac{p_2}{p_0} \right)^{R/c_p}. \]
   
   (c) Because we know $w$ and $p$, we can use the definition of $w$ to obtain $e$:
   
   \[ w \approx \frac{e}{p}. \]
   
   (d) Calculate $e_s(T)$ from the formula given in the *Notes*. Check your value against that from the graphs on the next page.
   
   (e) Calculate $w_s(T,p)$ from the formula given in the *Notes*.
   
   (f) RH: $r = e/e_s = w/w_s$.
   
   (g) Calculate $T_d$ from the formula given in the *Notes*.