18. This is a continuation of Example 18 from the lectures. We define the G_λ's and the form $(-,-)$ on $\mathfrak{t}^*$ by applying the procedure from the lectures to the trace form instead of the Killing form.

(i) Show that every $\lambda \in \mathfrak{t}^*$ can uniquely be written in the form $\sum_{i=1}^n \lambda_i \varepsilon_i$ with $\sum_{i=1}^n \lambda_i = 0$.
(ii) Describe G_λ and $(-,-)$ in terms of the coordinates λ_i.
(iii) What are the squared lengths of the roots $\varepsilon_i - \varepsilon_j$, $i \neq j$?
(iv) Describe the reflection $r_{\varepsilon_i - \varepsilon_j}$, $i \neq j$, in terms of the coordinates λ_k.