Homework 2

1. Exercise A1.1.

2. Exercise A1.6. Express the answer for part (c) in terms of the *dual norm*, which is defined as

$$\|y\|_* = \sup_{\|x\| \leq 1} x^T y.$$

   In part (e), first show that $C \subseteq (C^\circ)^\circ$ for *any* set C. Then show that $(C^\circ)^\circ \subseteq C$ if C is closed and convex with $0 \in C$. To prove this you can apply the strict separating hyperplane theorem of page 49 of the textbook: If C is a closed convex set and $x \notin C$, then there exists a vector $a \neq 0$ and a scalar b such that

$$a^T x > b, \qquad a^T z < b \text{ for all } z \in C.$$

3. Exercise T3.1.

4. Exercise T3.18 (a).

5. Exercise A2.10.

6. Exercise A5.8.