Exercises

14.24 [184] Prerequisites:[181],[17T].Difficulty:*.Let $C \subseteq \mathbb{R}^n$ be a convex set, let $f : C \to \mathbb{R}$ be a convex function, we fix $z \in C^\circ$: show that there exists $v \in \mathbb{R}^n$ such that

$$\forall x \in C, f(x) \geq f(z) + \langle v, x - z \rangle \ . \qquad (14.24)$$

The plane thus defined is called *support plan* for f in z. Note:*It is preferable not to assume that f is continuous, while proving this result, as this result is generally used to prove that f is continuous!*.

Solution 1. [185]