On this homework, use the below **Theorem S**, which we showed in class.
Thm. S. Let A and B be subsets of $\mathbb{R}$. In the extended sense (so in $\widehat{\mathbb{R}} := \mathbb{R} \cup \{\pm\infty\}$),

$$\sup(A + B) \;=\; (\sup A) + (\sup B)$$

provided the quantity $(\sup A) + (\sup B)$ is not of the ⟨indeterminate⟩ form $\infty - \infty$ nor $(-\infty) + (\infty)$.

34. Variant of Exercise 2.4.6. §2.4 BS4p45

Let $a \in \mathbb{R}$ and B be a subset of $\mathbb{R}$. Define the set

$$a + B \;:=\; \{a + b \colon b \in B\}\,.$$

Show that in the extended sense (so in $\widehat{\mathbb{R}} := \mathbb{R} \cup \{\pm\infty\}$),

$$\sup(a + B) \;=\; a + (\sup B)$$

using ⟨the above⟩ Theorem S.

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