Exercise 9. (Q2.4): An unbounded sequence (a_n) and a convergent sequence (b_n) with $(a_n - b_n)$ bounded.

This is not possible. Let $\lim b_n = L$, then given an $\epsilon \in \mathbb{R} > 0$, there exists an $N \in \mathbb{N}$, such that whenever $n > N$,

$$|b_n - L| < \epsilon$$
$$-\epsilon + L < b_n < \epsilon + L$$
$$-L - \epsilon < -b_n < -L + \epsilon$$
$$a_n - L - \epsilon < a_n - b_n < a_n - L + \epsilon,$$

which shows that since (a_n) isn't bounded, neither can $(a_n - b_n)$ be bounded.