Exercises:

3.2.2. Let

$$B = \left\{ \frac{(-1)^n n}{n+1} : n \in \mathbf{N} \right\}.$$

(a) Find the limit points of B.

(b) Is B a closed set?

(c) Is B an open set?

(d) Does B contain any isolated points?

(e) Find $\overline{B}$.

3.2.3. Decide whether the following sets are open, closed, or neither. If a set is not open, find a point in the set for which there is no ϵ-neighborhood contained in the set. If a set is not closed, find a limit point that is not contained in the set.

(a) $\mathbf{Q}$.

(b) $\mathbf{N}$.

(c) $\{x \in \mathbf{R} : x > 0\}$.

(d) $(0, 1] = \{x \in \mathbf{R} : 0 < x \leq 1\}$.

(e) $\{1 + 1/4 + 1/9 + \cdots + 1/n^2 : n \in \mathbf{N}\}$

3.2.11. Let A be bounded above so that $s = \sup A$ exists. Show that $s \in \overline{A}$.