

An example of a converging sequence is $\{\frac{1}{n}\}$ where

$$\lim_{n \rightarrow \infty} \frac{1}{n} = 0$$

so $\frac{1}{n} = 0$ is arbitrarily close to 0 as n is sufficiently large
An example of a diverging sequence is $\{n\}$ where

$$\lim_{n \rightarrow \infty} n = \infty$$

so n is arbitrarily close to ∞ as n is sufficiently large