2a. In each of ❶-❹, indicate <u>all</u> possible completions of the sentence that will make it into a true statement by ✓ing the corresponding ☐s. No explanation is required.

❶ $\displaystyle\sum_{n=1}^{\infty}\frac{1}{n}=1+\frac{1}{2}+\frac{1}{3}+\frac{1}{4}+\cdots+\frac{1}{n}+\cdots$ is

☐ a convergent sequence ☐ a divergent sequence

☐ a convergent series ☑ a divergent series ☐ none of these

❷ $\displaystyle\left\{\frac{1}{n}\right\}_{n=1}^{\infty}=\left\{1,\frac{1}{2},\frac{1}{3},\frac{1}{4},\cdots,\frac{1}{n},\cdots\right\}$ is

☑ a convergent sequence ☐ a divergent sequence

☐ a convergent series ☐ a divergent series ☐ none of these

❸ $\displaystyle\left\{\frac{1}{2^{n-1}}\right\}_{n=1}^{\infty}=\left\{1,\frac{1}{2},\frac{1}{4},\frac{1}{8},\cdots,\frac{1}{2^{n-1}},\cdots\right\}$ is

☑ a convergent sequence ☐ a divergent sequence

☐ a convergent series ☐ a divergent series ☐ none of these

❹ $\displaystyle\sum_{n=1}^{\infty}\frac{1}{2^{n-1}}=1+\frac{1}{2}+\frac{1}{4}+\frac{1}{8}+\cdots+\frac{1}{2^{n-1}}+\cdots$ is

☐ a convergent sequence ☐ a divergent sequence

☑ a convergent series ☐ a divergent series ☐ none of these

2b. In each of ❺-❻, if there exists a sequence $\{a_n\}_{n=1}^{\infty}$ satisfying the given conditions, write its general term inside the box; and if no such sequence exists, write DOES NOT EXIST inside the box. No explanation is required.

❺ The sequence $\{a_n\}_{n=1}^{\infty}$ diverges and the sequence $\{(-1)^n a_n\}_{n=1}^{\infty}$ converges.

$$a_n = \boxed{(-1)^n}$$

❻ The series $\displaystyle\sum_{n=1}^{\infty} a_n$ converges and the series $\displaystyle\sum_{n=1}^{\infty}(-1)^n a_n$ diverges.

$$a_n = \boxed{\frac{(-1)^n}{n}}$$