11.1 Sequences

◎ 單選擇題

1. Let $x=\cfrac{1}{4+\cfrac{1}{4+\cfrac{1}{4+\cdots}}}$. Find its value, $x=?$

(A) 1/2; (B) 1/3; (C) $-2+\sqrt{5}$; (D) does not exist.

Ans: C [99 學年度]

2. The **limit** of the sequence $\left\{\sqrt{3},\sqrt{3\sqrt{3}},\sqrt{3\sqrt{3\sqrt{3}}},\cdots\right\}$ is

(A) 0; (B) 1; (C) 2; (D) 3.

Ans: D [100 學年度]

3. Let $a_1=0, a_2=1$ and $a_{n+1}=\frac{2}{3}a_n+\frac{1}{3}a_{n-1}$ for n ≥ 2. The **limit** of a_n is

(A) $\frac{1}{3}$; (B) $\frac{1}{2}$; (C) $\frac{2}{3}$; (D) $\frac{3}{4}$.

Ans: D [104 學年度]

◎ 多選擇題

1. Which of the following sequences are **convergent**?

(A) $a_n=\left(1+\cfrac{2}{n}\right)^n$.

(B) $a_n=\ln\left(2n^2+1\right)-\ln\left(n^2+1\right)$.

(C) $\left\{a_n\right\}=\left\{3,10,5,16,8,4,2,1,4,2,1,4,2,1,\ldots\right\}$.

(D) $a_n=\cfrac{n!}{2^n}$.

Ans: AB [100 學年度]

2. A sequence $\{a_n\}_{n=0}^{\infty}$ is given by $a_0 = 2$, $a_{n+1} = 5 - \frac{4}{a_n}$.

Which of the following statements are **TRUE**?

(A) $\{a_n\}_{n=0}^{\infty}$ is increasing; (B) $\{a_n\}_{n=0}^{\infty}$ is bounded;

(C) $a_2 = \frac{10}{3}$; (D) $\lim_{n\to\infty} a_n = 4$.

Ans: ABD [101 學年度]