1. Sia dato l'insieme $A = \left\{ \dfrac{2n\left|\sin\frac{n\pi}{2}\right|+1}{n+2} \ : \ n \in \mathbb{N} \right\}$. Allora

Risp.: $\boxed{\text{A}}$: $\min A = \frac{1}{2}, \sup A = 2$ $\boxed{\text{B}}$: $\inf A = -2, \max A = \frac{1}{2}$ $\boxed{\text{C}}$: $\inf A = -2, \sup A = 2$ $\boxed{\text{D}}$: $\inf A = 0, \sup A = 2$

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2. Sia dato il numero complesso

$$\frac{3e^{8\pi i} + 3\sqrt{3}e^{i\frac{\pi}{2}}}{\left(\dfrac{1-i}{|1+i|}\right)^{25}} + Re\left(\frac{15i}{i+2}\right) - 3e^{2\pi i}.$$

Le sue radici cubiche sono date da

Risp.: $\boxed{\text{A}}$: $\{e^{i\frac{7}{36}\pi}, e^{i\frac{31}{36}\pi}, e^{i\frac{55}{36}\pi}\}$ $\boxed{\text{B}}$: $\{\sqrt[3]{6}e^{i\frac{7}{36}\pi}, \sqrt[3]{6}e^{i\frac{31}{36}\pi}, \sqrt[3]{6}e^{i\frac{55}{36}\pi}\}$ $\boxed{\text{C}}$: $\{\sqrt[3]{6}e^{i\frac{\pi}{3}}, \sqrt[3]{6}e^{i\pi}, \sqrt[3]{6}e^{i\frac{5}{3}\pi}\}$ $\boxed{\text{D}}$: $\{e^{i\frac{\pi}{3}}, e^{i\pi}, e^{i\frac{5}{3}\pi}\}$

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3. Il limite

$$\lim_{x\to+\infty}\left[\frac{x\left(1-e^{\frac{7x}{1+x^2}}\right)}{(x+3)\sin\frac{7}{x}} + \left(\frac{e^x+8}{e^x+2}\right)^{e^x+7} + \frac{1}{\sqrt{49x^2+7x+2}-7x}\right]$$

vale

Risp.: $\boxed{\text{A}}$: $1+e^6$ $\boxed{\text{B}}$: 2 $\boxed{\text{C}}$: e^6 $\boxed{\text{D}}$: $+\infty$

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4. Il limite

$$\lim_{n\to+\infty}\frac{n![\ln(n!+3)-\ln n!]\ln(3n)}{n^{\frac{3}{n}}-1+\ln[(n+3)!]-\ln n!}$$

vale

Risp.: $\boxed{\text{A}}$: 3 $\boxed{\text{B}}$: $\frac{1}{3}$ $\boxed{\text{C}}$: 0 $\boxed{\text{D}}$: 1

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5. Siano $\alpha \in \mathbb{R}$ e $f : I \to \mathbb{R}$ definita da

$$f(x) = \begin{cases} \dfrac{\arctan^2(7x)}{x(1+7x)^{\frac{1}{x}}} - \sqrt{x^2+3x+2} & \text{se } x > 0 \\[2ex] \alpha + \sqrt{\dfrac{\pi-x}{x+3}} & \text{se } x \leq 0 \end{cases}$$

Stabilire se le seguenti affermazioni sono vere o false.

(a) Il dominio I di f è dato da $]-3,\pi]$ $\boxed{\text{V}}$ $\boxed{\text{F}}$

(b) f è continua in $x=0$ se e solo se $\alpha = -\sqrt{\frac{\pi}{3}} - \sqrt{2}$ $\boxed{\text{V}}$ $\boxed{\text{F}}$

(c) $y = -x$ è asintoto obliquo per $x \to +\infty$ $\boxed{\text{V}}$ $\boxed{\text{F}}$
