1. Sia dato l'insieme $A = \left\{ \cos((n+1)\pi) e^{-n^2+20n+7\pi} \ : \ n \in \mathbb{N} \right\}$. Allora

   Risp.: [A] : $\min A = -e^{99+7\pi}, \max A = e^{100+7\pi}$ [B] : $\inf A = 0, \max A = e^{99+7\pi}$ [C] : $\min A = -e^{100+7\pi}, \max A = e^{99+7\pi}$ [D] : $\min A = -e^{7\pi}, \sup A = 0$

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2. Le radici quarte del numero complesso

$$5\left(\frac{3i-1}{\sqrt{2}+2\sqrt{2}i}\right)^{38} + \frac{(1-i)^2+|1-i|^2}{e^{\frac{3}{2}\pi i}} - 2e^{2\pi i} + \frac{1-|e^{7\sqrt{2}i}|}{3+i}$$

   sono date da

   Risp.: [A] : $\{3^4 e^{i\frac{3}{8}\pi}, 3^4 e^{i\frac{7}{8}\pi}, 3^4 e^{i\frac{11}{8}\pi}, 3^4 e^{i\frac{15}{8}\pi}\}$ [B] : $\{e^{i\frac{3}{8}\pi}, e^{i\frac{7}{8}\pi}, e^{i\frac{11}{8}\pi}, e^{i\frac{15}{8}\pi}\}$
   [C] : $\{\sqrt[4]{3}e^{i\frac{3}{8}\pi}, \sqrt[4]{3}e^{i\frac{7}{8}\pi}, \sqrt[4]{3}e^{i\frac{11}{8}\pi}, \sqrt[4]{3}e^{i\frac{15}{8}\pi}\}$ [D] : $\left\{\frac{1}{\sqrt[4]{3}}e^{i\frac{3}{8}\pi}, \frac{1}{\sqrt[4]{3}}e^{i\frac{7}{8}\pi}, \frac{1}{\sqrt[4]{3}}e^{i\frac{11}{8}\pi}, \frac{1}{\sqrt[4]{3}}e^{i\frac{15}{8}\pi}\right\}$

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3. Il limite

$$\lim_{x\to 0^+} \frac{\ln x \, \ln\left(1+\frac{3}{\ln x}\right) \sin(x-\sqrt{x})}{2\sqrt{e^{-2\pi/x}+\sin(8x)-7\tan x} - x}$$

   vale

   Risp.: [A] : -3 [B] : $\frac{3}{\sqrt{2\pi}}$ [C] : 0 [D] : $-\frac{3}{2}$

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4. Il limite

$$\lim_{n\to +\infty} \frac{2e^n[n^{\frac{4}{n}}-1][\sqrt{e^{2n}+n^3+2}-e^n]}{(n^2+\arctan n!)(\ln(n+5)!-\ln(n+2)!)}$$

   vale

   Risp.: [A] : $\frac{8}{3}$ [B] : π [C] : $\frac{4}{3}$ [D] : 0

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5. Sia $f : [-3,+\infty[\setminus\{-1\} \to \mathbb{R}$ definita da

$$f(x) = \begin{cases} \sqrt{\dfrac{x+3}{|x+1|}} & \text{se } x \le 0 \\ \\ \dfrac{1-\cos x}{x+\pi x^2} + \sqrt{x(x+3)} & \text{se } x > 0 \end{cases}$$

   Stabilire se le seguenti affermazioni sono vere o false.

   (a) f ammette un salto in $x=0$ di modulo $\sqrt{3}$ [V] [F]

   (b) $y = x + \frac{3}{2}$ è asintoto obliquo per $x \to +\infty$. [V] [F]

   (c) $f([-3,0]\setminus\{-1\}) = [0,+\infty[$ [V] [F]
