Eserc. 20/22 novembre 2019 (A)

Note Title 11/20/2019

Test VIII sett.

D. 1

$$\frac{1}{3(\lg n)\sin\frac{1}{n}} = \frac{1}{3(\lg n)\left[\frac{1}{n}+o\left(\frac{1}{n}\right)\right]}$$

$$= \frac{1}{\frac{1}{n}3\lg n + o\left(\frac{1}{n}\right)3\lg n} \longrightarrow +\infty$$

$$\frac{\lg x}{x} \xrightarrow[x\to+\infty]{} 0$$

B

NOTA $x > 0$, $x \neq 1$; $\frac{1}{x} \neq k\pi$ $k>0$

$x > 1$ $\lim_{1^+} = +\infty$

$\frac{1}{3\lg(x)\sin\frac{1}{x}}$

$x < 1$ $\lim_{1^-} = -\infty$

$\lim_{\frac{1}{k\pi}^{\pm}} = \mp\infty$

no

$x \to \frac{1}{k\pi}^{+}$ $\frac{1}{x} \to (k\pi)^{-}$

11
27
27
18
54

D 2

$a_1 = 1 + \sin 1 - e < 0$

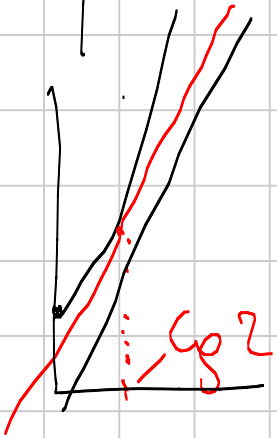
$a_2 = \dfrac{4 + \sin 2 - e^2}{(\lg 2)^2 - 4}$

Demon $\vee$ 0

a_n : $\wedge$ 0

VARIAZIONE

e^x | $2x$



lg 2

$\cancel{1 + x + \frac{x^2}{2} + n = e^x}$ $x > 0$

$e^x > x^2 + 1$?

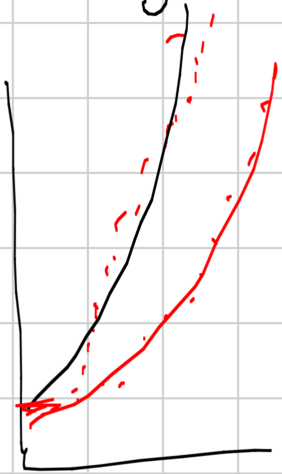
$x^2 + 1$

$e^{\lg 2} = 2$

$y = 2x + \lg 2 > 2x$

> 0

$(\lg 2, 2)$



D.3 denominatore

$$3 \underset{=}{>} 2 - \cos n \underset{\neq}{\geq} 1$$

$\cos n \neq \pm 1$ poiché π è irrazionale.

D.4 D $(-1)^n = \cos(n\pi)$

D.5 è positiva $\xrightarrow[n \to \infty]{} 0$ HA MAX

D6 $\tan(n\pi) = 0$

$e^{n! \tan(n!\pi)} = 1$

$\left(\{\sin n\}_{n \in \mathbb{N}} \text{ è denso in } [-1, 1] \right)$

$\forall \varepsilon > 0 \quad \forall x \in [-1, 1] \quad \exists n \quad |x - \sin n| \leq \varepsilon$

DENOMINATORE $\rightarrow n \geq 1$

$\lg(1 + 3^{n \lg n}) = \lg \left(3^{n \lg n} \left(\frac{1}{3^{n \lg n}} + 1 \right) \right) = n \lg n \cdot \lg 3 + \lg(1 + o(1))$

$\times$ $\lg(n+5^n) = \lg\left[5^n\left(\frac{n}{5^n}+1\right)\right] = n\lg 5 + \lg(1+o(1))$

$$a_n = \frac{\cancel{1} - \cancel{1} + \cancel{n^2}\sin n}{\cancel{4}\lg n \lg 3 \cdot \lg 5 + (n\lg n)o(1) + n\,o(1) + o(1)} \longrightarrow 0$$

$o(n^2 \lg n) \leftarrow$

Denom. > 0 $n \geq 1$

Num $n^2 \sin n$ $\sin 1 > 0$ $\sin 4 < 0$

$$n^2 \lg n \lg 3 \lg 5 + (n \lg n)\cdot o(1) + n(o(1)) + o(1)$$

$$n^2 \lg n \left(\lg 3 \lg 5 + \frac{o(1)}{n} + \frac{o(1)}{n \lg n} + o(1) \right)$$

$$\boxed{\frac{2^n n}{\lg n \left[\lg 3 \cdot \lg 5 + o(1) \right]} = a_n}$$

D7 C. RAP.

$$\frac{(n+1)^{n+1}}{(2n+2)!} \cdot \frac{(2n)!}{n^n} = \frac{(n+1)}{(2n+2)(2n+1)} \left(\frac{n+1}{n} \right)^n =$$

$$= \frac{n+1}{(2n+2)(2n+1)} \left(1 + \frac{1}{n} \right)^n$$

$0 \leftarrow \frac{n+1}{(2n+2)(2n+1)}$, $\left(1+\frac{1}{n}\right)^n \to e$

D

$$1 > \frac{n \cdot n \cdots n \; n}{2n \cdot 2n-1 \cdots (n+2)(n+1)} \quad \frac{1}{n \cdots 2} \to 0$$

D8 $\frac{1}{(-1)^n} \frac{\log n}{3n^2} \boxed{\frac{1+o(1)}{\left(1 + \frac{1}{3n^2}\right)}}$

0

D 9)

$$n\,(-1)^n\left(1-\cos\frac{1}{n}\right)\overset{TS}{=}$$

$$=(-1)^n\, n\left(\frac{1}{2n^2}+O\left(\frac{1}{n^4}\right)\right)$$

$$=(-1)^n\left[\frac{1}{2n}+\underbrace{O\left(\frac{1}{n^3}\right)}_{\omega}\right]$$

ha segni alterni

D10

$$a_n = \cos\left(\frac{n\pi - \sin\frac{2}{n}}{n+3}\right) \operatorname{tg}\sqrt{\frac{3+(-1)^n}{n^2\cos\frac{1}{n}}}$$

$$-1 \leq \frac{n}{n+3}\pi - \left(\sin\frac{2}{n}\right)\frac{1}{n+3}$$

$$\downarrow$$

$$\pi$$

INUTILE PER RISPOND

$$\operatorname{tg}\left(\frac{1}{n}\sqrt{\frac{3+(-1)^n}{1+o(1)}}\right)$$

$$\frac{1}{2} \leq \cdot \leq 5$$

1 X sett.

D1 $a_n = e^{4n\left(\lg\left(\sin\sqrt[4]{|\sin n|}\right)\right)}$

$\lg \sin Q \le 0$

≤ 1

$\sqrt[4]{|\sin n|} \le 1 < \frac{\pi}{2}$, $\ne$, > 0

$0 < \sin\sqrt[4]{|\sin n|} < \sin 1 < 1$

$\lg \sin 1 \ne 0$

$e^{4n \lg \sin \sqrt[4]{\frac{|mn|}{\ }}}$ $< \sin 1$

$\wedge$

$e^{4n \lg \sin 1} \longrightarrow 0$

$4n \lg \sin 1 \longrightarrow -\infty$

$\lg \sin 1 < 0$