TUTORATO DEL 23\12\2022

1) Calcolare i seguenti limiti

(i) $\lim_{x\to 0} \dfrac{\sin(\log(1+2x)) - e^{2x} + 1}{\operatorname{tg}(x^2)}$

(ii) $\lim_{x\to 0} \dfrac{\log(\cos 2) + \log(e^x - x) - \frac{x^3}{6}}{x^3 \operatorname{arctg} x}$

(iii) $\lim_{x\to 0} \dfrac{xe^x - \log(1+x)}{x^2}$

(iv) $\lim_{x\to 0} \dfrac{\sin x \cdot e^x - 2\sqrt{1+x} + 2}{\log(1+x^2)}$

(v) $\lim_{x\to 0} \dfrac{e^{x(1-x)} - \sin x + \log(1+x^2) - 1}{x^2}$

2) Dire se le seguenti serie convergono o meno

(i) $\sum_{n=1}^{+\infty} \dfrac{1 - e^{\sqrt{\frac{1}{n}}}}{n}$ (ii) $\sum_{n=1}^{+\infty} \dfrac{n+3}{n^3 - n^2 + 4}$

(iii) $\sum_{n=2}^{+\infty} \frac{1}{\sqrt{n^3 - n^2}}$

(iv) $\sum_{n=1}^{+\infty} \frac{(n+2)^n}{n^{n+2}}$

(v) $\sum_{n=1}^{+\infty} \frac{1}{n} - \frac{1}{n+1}$

(vi) $\sum_{n=1}^{+\infty} (-1)^n \left(\sin \frac{1}{n}\right)^2$

(vii) $\sum_{n=2}^{+\infty} (-1)^n \frac{1}{n \log^2 n}$

(viii) $\sum_{n=1}^{+\infty} \frac{1}{n!}$