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b) $$\sum_{n=1}^{+\infty}\left[\frac{(-3)^{n-1}}{2^{2n}}+\frac{1}{n^2}-\frac{1}{(n+1)^2}\right]$$

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

C.A.

$$\text{Soma}=\frac{a_1}{1-r}$$

$$\text{Soma}=\frac{-3/4}{\frac{7}{4}}=-\frac{3}{4}\times\frac{4}{7}=-\frac{3}{7}$$

$$=\sum_{n=1}^{+\infty}\frac{(-3)^n}{4^n}\times\left(-\frac{1}{3}\right)+\sum_{n=1}^{+\infty}\frac{1}{n^2}-\frac{1}{(n+1)^2}$$

$$=-\frac{1}{3}\cdot\sum_{n=1}^{+\infty}\left(\frac{-3}{4}\right)^n+\sum_{n=1}^{+\infty}\frac{1}{n^2}-\sum_{n=1}^{+\infty}\frac{1}{(n+1)^2}=$$

$\Downarrow$

P. geométrica $r=\frac{-3}{4}$

$$=-\frac{1}{3}\times\left(-\frac{3}{7}\right)+\sum_{n=1}\frac{1}{n^2}-\sum_{n=1}\frac{1}{(n+1)^2}$$

$$=\frac{1}{7}+\sum_{n=1}^{+\infty}\frac{1}{n^2}-\sum_{n=1}^{+\infty}\frac{1}{(n+1)^2}$$

3.

$$\lim_{y\to0^+}\int_y^1\frac{1}{x^\alpha}\,dx$$

$$\int_0^1\frac{1}{x^\alpha}\,dx=\begin{cases}\frac{1}{1-\alpha} & \text{se } 0<\alpha<1\\ \infty & \text{se } \alpha\geq1\end{cases}$$

$$\int_0^1\frac{1}{x^\alpha}\,dx=\lim_{y\to0^+}\int_y^1\frac{1}{x^\alpha}\,dx=\lim_{y\to0^+}\left[\ln(x)\right]_y^1$$

não existe

$$=\lim_{y\to0^+}\left(\ln(1)-\ln(y)\right)$$

$$=0$$