(1) $$\begin{vmatrix} 1 & 0 & 3 & -2 \\ 2 & -2 & 1 & 1 \\ 1 & 1 & 4 & 0 \\ 1 & -1 & 2 & 4 \end{vmatrix} = (-1)^{1+1} \cdot 1 \cdot \begin{vmatrix} -2 & 1 & 1 \\ 1 & 4 & 0 \\ -1 & 2 & 4 \end{vmatrix} + (-1)^{1+3} \cdot 3 \begin{vmatrix} 2 & -2 & 1 \\ 1 & 1 & 0 \\ 1 & -1 & 4 \end{vmatrix} + (-1)^{1+4} \cdot (-2) \begin{vmatrix} 2 & -2 & 1 \\ 1 & 1 & 4 \\ 1 & -1 & 2 \end{vmatrix}$$

$$= \left(-32+2-(-4+4)\right) + 3\cdot\left(8-1-(1-8)\right) + 2\cdot\left(4-1-8-(1-8-4)\right)$$

$$= -30 + 3\cdot 14 + 2\cdot 6 = \underline{\underline{24}}$$

(2) $$\sum \underbrace{\frac{2n+n^2}{n^3+2}}_{a_n>0}$$

LSS s $b_n = \frac{n^2}{n^3} = \frac{1}{n}$ $\quad \sum \frac{1}{n}$ D

$$\lim_{n\to\infty} \frac{a_n}{b_n} = \lim \frac{2n+n^2}{n^3+2} \cdot \frac{n^3}{n^2} = \lim_{n\to\infty} \frac{\frac{2}{n}+1}{1+\frac{2}{n^3}} = 1 \in (0,\infty)$$

$\Rightarrow$ LSS $\quad \underline{\sum a_n \ \ D}$

(3) $$\int \sin(x+1) + \frac{x^2}{x^2+1}\, dx = \int \sin(x+1) + 1 + \frac{-1}{x^2+1}\, dx$$

$$\overset{c}{=} \underline{-\cos(x+1) + x - \arctan x}$$

$\underline{\underline{x\in\mathbb{R}}}$

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(1) $\begin{vmatrix} 1 & 0 & 3 & -2 \\ 1 & -1 & 1 & 1 \\ 1 & 1 & 4 & 0 \\ 1 & -1 & 2 & 4 \end{vmatrix} \sim \begin{vmatrix} 1 & 0 & 3 & -2 \\ 0 & -1 & 1 & 1 \\ 2 & 1 & 4 & 0 \\ 0 & -1 & 2 & 4 \end{vmatrix} = (-1)^{1+1} \cdot 1 \cdot \begin{vmatrix} -1 & 1 & 1 \\ 1 & 4 & 0 \\ -1 & 2 & 4 \end{vmatrix} + (-1)^{3+1} \cdot 2 \begin{vmatrix} 0 & 3 & -2 \\ -1 & 1 & 1 \\ -1 & 2 & 4 \end{vmatrix}$

$= \left(-16 + 2 - (-4 + 4)\right) + 2\left(-3 + 4 - (2 - 12)\right) = \underline{\underline{8}}$

(2) $\sum_{n=1}^{\infty} \underbrace{\frac{n^2}{n^4 + 2n}}_{a_n > 0}$ LSK s $b_n = \frac{n^2}{n^4} = \frac{1}{n^2}$ $\sum \frac{1}{n^2}$ k

$\lim_{n\to\infty} \frac{a_n}{b_n} = \lim \frac{n^2 \cdot 1}{n^4\left(1 + \frac{2}{n^3}\right)} \cdot \frac{n^4}{n^2} = 1 \in (0, \infty) \Rightarrow \underline{\underline{\sum a_n \text{ k}}}$

(3) $\int \cos(x+1) + \frac{2+x^2}{x^2+1}\, dx = \int \cos(x+1) + 1 + \frac{1}{1+x^2}\, dx$

$\stackrel{c}{=} \underline{\underline{\sin(x+1) + x + \arctan x}}$

$\underline{x \in \mathbb{R}}$