$H) \quad \sum_{n=1}^{\infty} \frac{\cos(n\pi)}{2^n} =$

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

$\frac{1}{3} - \frac{1}{18} + \frac{1}{83} - \frac{1}{256} + \cdots$

$\frac{1}{3} + \frac{1}{18} + \frac{1}{83} + \frac{1}{256} + \cdots$

$\text{J}) \quad \sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{n^4+2} =$

Absolute Convergence

$\sum_{n=1}^{\infty} \frac{1}{n^4+2}$ converges

① $\lim_{n \to \infty} \left| \frac{(-1)^{n+1}}{n^4+2} \right| = 0$

Compare to $\sum_{n=1}^{\infty} \frac{1}{n^4}$

converges $p = 4 > 1$

② $\left| \frac{(-1)^{(n+1)+1}}{(n+1)^4+2} \right| < \left| \frac{(-1)^{n+1}}{n^4+2} \right|$

$\lim_{n \to \infty} \frac{\frac{1}{n^4+2}}{\frac{1}{n^4}} = \frac{n^4}{n^4+2} = 1$

$K) \quad \sum_{n=1}^{\infty} \frac{(-1)^n}{(1.1)^n}$

Conditional Convesgence	8) $\sum_{n=1}^{\infty} \frac{(-1)^n e^{1/n}}{n} =$ ① $\lim_{n \to \infty} \left\| \frac{(-1)^n e^{1/n}}{n} \right\| = 0$ ② $\left\| \frac{(-1)^{n+1} e^{1/(n+1)}}{n+1} \right\| < \left\| \frac{(-1)^n e^{1/n}}{n+1} \right\|$ $\sum_{n=1}^{\infty} \frac{e^{1/n}}{n}$ diverges compare to $\sum_{n=1}^{\infty} \frac{1}{n}$ Harmonic $\lim_{n \to \infty} \frac{\frac{e^{1/n}}{n}}{\frac{1}{n}} = \frac{n e^{1/n}}{n} = 1$ 11) $\sum_{n=1}^{\infty} \frac{\cos(n\pi)}{n^{3/4}} = \sum_{n=1}^{\infty} \frac{(-1)^n}{n^{3/4}}$ 12) $\sum_{n=1}^{\infty} \frac{\sin\left(\frac{n\pi}{2}\right)}{n!} = \sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{n!}$ $\sum_{n=1}^{\infty} \frac{1}{n!}$ Ratio Test $\lim_{n \to \infty} \left\| \frac{(-1)^{n+1}}{n!} \right\| = 0$ $\left\| \frac{(-1)^{(n+1)+1}}{(n+1)!} \right\| < \left\| \frac{(-1)^{n+1}}{n!} \right\|$ 15) $\sum_{n=1}^{\infty} \frac{(-1)^n n^n}{n!} =$ $\lim_{n \to \infty} \left\| \frac{(-1)^n n^n}{n!} \right\| \neq 0$

Diverges