$l_2 \quad \sum_{r=1}^{r=n} \frac{r^4}{n^5}$

$$\frac{1}{n} \quad l_2 = \lim_{n\to\infty} \frac{1}{n} \sum_{r=1}^{r=n} \left(\frac{r}{n}\right)^4 = \int_0^1 x^4\,dx = \frac{1}{5}$$

$l_{n\to\infty} \frac{r}{n}$

$l_1 + l_2$

$$\frac{1}{4} - \frac{1}{5} = \frac{1}{20}$$

$\boxed{Q2}$ $$\lim_{n\to\infty} \left[\frac{n+1}{n^2+1^2} + \frac{n+2}{n^2+2^2} + \frac{n+3}{n^2+3^2} + \cdots + \frac{3}{5n} \right]$$

$\frac{n+r}{n^2+r^2}$

$l_n = \frac{2n}{2n^2} = \frac{1}{n}$

$l_{2n} = \frac{3n}{5n^2} = \frac{3}{5n}$

:)

$$\lim_{n\to\infty} \sum_{r=1}^{r=2n} \frac{1}{n} \left(\frac{1+\frac{r}{n}}{1+\left(\frac{r}{n}\right)^2} \right)$$

:) $$I = \int_0^2 \frac{1+x}{1+x^2}\,dx$$

$n\to\infty \left(\frac{r}{n}\right) \to x$