Problem 2) Since all the terms of zeta-function are positive, we can rearrange them. Separating the odd terms from the even terms, we find:

$$\sum_{n=1}^{\infty}\frac{1}{n^4}=\sum_{n=1}^{\infty}\frac{1}{(2n)^4}+\sum_{n=1}^{\infty}\frac{1}{(2n-1)^4}=\frac{1}{16}\sum_{n=1}^{\infty}\frac{1}{n^4}+\sum_{n=1}^{\infty}\frac{1}{(2n-1)^4}\Rightarrow$$

$$\sum_{n=1}^{\infty}\frac{1}{(2n-1)^4}=\left(1-\frac{1}{16}\right)\sum_{n=1}^{\infty}\frac{1}{n^4}=\frac{15}{16}\times\frac{\pi^4}{90}=\frac{\pi^4}{96}\ \checkmark$$