Quiz 17

1. $\sum_{k=2}^{\infty} \frac{5k^2}{k^4-2} \sim \frac{1}{k^2}$ $\lim_{k\to\infty} \frac{\frac{5k^2}{k^4-2}}{\frac{1}{k^2}} = \lim_{k\to\infty} \frac{5k^4}{k^4-2} =$

$\lim_{k\to\infty} \frac{20k^3}{4k^3} = 5 \neq 0$, $\sum \frac{1}{k^2}$ conv p-series $p=2>1$

$\therefore \sum_{k=2}^{\infty} \frac{5k^2}{k^4-2}$ also convergent by LCT

2. $\sum_{k=2}^{\infty} \frac{5+k}{k^2} > \frac{k}{k^2} = \frac{1}{k}$, $\sum \frac{1}{k}$ divergent p-series, $p=1$

$\therefore$ by DCT, $\sum \frac{5+k}{k^2}$ also diverges

3. $\sum_{k=2}^{\infty} \frac{k^3}{\sqrt{k^9+5}} < \frac{k^3}{\sqrt{k^9}} = \frac{k^3}{k^{9/2}} = \frac{1}{k^{3/2}}$,

$\sum \frac{1}{k^{3/2}}$ convergent p-series $p = 3/2 > 1$

$\therefore \sum_{k=2}^{\infty} \frac{k^3}{\sqrt{k^9+5}}$ also converges by DCT