d) $\lim_{x \to 4} \left[\frac{x^2 - 8x + 16}{x^2 - 5x + 4}\right]$

$= \frac{4^2 - 8(4) + 16}{4^2 - 5(4) + 4} = \frac{0}{0}$ Undefined

$\lim_{x \to 4} \frac{2x - 8}{2x - 5}$

$= \frac{2(4) - 8}{2(4) - 5} = \frac{0}{3} = 0$

$\lim_{x \to 4} \left[\frac{x^2 - 8x + 16}{x^2 - 5x + 4}\right] = 0$

2a) $\frac{2}{2 \times 3} + \frac{2}{3 \times 4} + \frac{2}{4 \times 5} + \frac{2}{5 \times 6} + \cdots$

$U_n = \frac{2}{(n+1) \times (n+2)}$, $U_{n+1} = \frac{2}{(n+1+1)(n+2+1)} = \frac{2}{(n+2)(n+3)}$

$\lim_{n \to \infty} \frac{U_{n+1}}{U_n} = \frac{2}{(n+2)(n+3)} \times \frac{(n+1)(n+2)}{2}$

$= \frac{n^2 + 3n + 2}{n^2 + 5n + 6}$

divide through by the highest power of n

$\lim_{n \to \infty} \frac{U_{n+1}}{U_n} = \frac{n^2/n^2 + \frac{3n}{n^2} + 2/n^2}{n^2/n^2 + 5n/n^2 + 6/n^2}$

$= \frac{1 + 0 + 0}{1 + 0 + 0} = \frac{1}{1} = 1$

It may be either Convergent or divergent Using test / or U_n

$U_n = \frac{2}{n^2 + 3n + 2}$

$= \frac{2/n^2}{n^2/n^2 + 3n/n^2 + 2/n^2} = \frac{0}{1 + 0 + 0}$

$= 0$ Converge.