i) $n=1$ $\quad \frac{1}{1\cdot 2\cdot 3} = \frac{1\cdot 4}{4\cdot 2\cdot 3}$ ✓

n ✓ $\Rightarrow$ $n+1$ ✓

$$\sum_{k=1}^{n+1} \frac{1}{k(k+1)(k+2)}$$ hyp. de rec.

$$= \frac{n(n+3)}{4(n+1)(n+2)} + \frac{1}{(n+1)(n+2)(n+3)}$$

$$= \frac{n(n+3)^2 + 4}{4(n+1)(n+2)(n+3)} \qquad -n^2+6n+9$$

$$= \frac{n^3+6n^2+9n+4}{4(n+1)(n+2)(n+3)}$$

$$\begin{array}{r} 1\ 6\ 9\ 4 \\ -1\ -1\ -5\ -4 \\ \hline 1\ 5\ 4\ 0 \end{array}$$

$$= \frac{(n+1)(n+1)(n+4)}{4(n+1)(n+2)(n+3)}$$

$$= \frac{(n+1)(n+1+3)}{4(n+1+1)(n+1+2)}$$ CQFD