

$$\begin{aligned}
1) a) & \sigma_{re1} + \sum_{i=1}^{n-1} \left[\sum_{j=i+1}^n \left[\sum_{k=1}^j \sigma_{re2} \right] \right] = \\
& = \sigma_{re1} + \sum_{i=1}^{n-1} \left[\sum_{j=i+1}^n j \cdot \sigma_{re2} \right] \quad \xrightarrow{\text{la saco afuera}} \\
& = \sigma_{re1} + \sum_{i=1}^{n-1} \left[\sigma_{re2} \cdot \sum_{j=i+1}^n j \right] = \\
& = \sigma_{re1} + \sum_{i=1}^{n-1} \left[\sigma_{re2} \cdot \left(\sum_{j=1}^n j - \sum_{j=1}^i j \right) \right] = \\
& = \sigma_{re1} + \sum_{i=1}^{n-1} \left[\sigma_{re2} \cdot \left(\frac{n(n+1)}{2} - \frac{i(i+1)}{2} \right) \right] = \\
& \quad \nearrow \text{saco afuera y distribuyo sumatoria} \\
& = \sigma_{re1} + \sum_{i=1}^{n-1} \sigma_{re2} \cdot \left(\frac{n(n+1)}{2} - i \left(\frac{i+1}{2} \right) \right) = \frac{i^2 + i}{2} \\
& = \sigma_{re1} + \sigma_{re2} \cdot \left(\sum_{i=1}^{n-1} \frac{n(n+1)}{2} - \sum_{i=1}^{n-1} \frac{i(i+1)}{2} \right) = \\
& = \sigma_{re1} + \sigma_{re2} \cdot \left(\left((n-1) \cdot \left(\frac{n(n+1)}{2} \right) \right) - \left(\sum_{i=1}^{n-1} \frac{i^2 + i}{2} \right) \right) \quad \begin{matrix} \nearrow \text{distribuyo} \\ \nearrow \text{saco afuera} \end{matrix} \\
& = \sigma_{re1} + \sigma_{re2} \cdot \left(\left((n-1) \cdot \left(\frac{n(n+1)}{2} \right) \right) - \left(\sum_{i=1}^{n-1} (i^2 + i) \cdot \frac{1}{2} \right) \right) = \\
& = \sigma_{re1} + \sigma_{re2} \cdot \left(\left((n-1) \cdot \left(\frac{n(n+1)}{2} \right) \right) - \left(\frac{1}{2} \cdot \left(\sum_{i=1}^{n-1} i^2 + \sum_{i=1}^{n-1} i \right) \right) \right) = \\
& = \sigma_{re1} + \sigma_{re2} \cdot \left(\left((n-1) \cdot \left(\frac{n(n+1)}{2} \right) \right) - \left(\frac{1}{2} \cdot \left((n-1)n \cdot \frac{(2n-2+1)}{6} \right) \right) \right)
\end{aligned}$$

$$\begin{aligned}
& + \left(\frac{(n-1) \cdot n}{2} \right) = \\
& = \alpha e_1 + \alpha e_2 \cdot \left(\left((n-1) \cdot \left(\frac{n(n+1)}{2} \right) \right) - \left(\frac{1}{2} \cdot \frac{(n-1)n \cdot (2n-1) + \left(\frac{(n-1) \cdot n}{2} \right)}{6} \right) \right) = \\
& = \alpha e_1 + \alpha e_2 \cdot \left(\left((n-1) \cdot \frac{n^2+n}{2} \right) - \left(\frac{1}{2} \cdot \left(\frac{(n^2-n) \cdot (2n-1) + \frac{n^2-n}{2}}{6} \right) \right) \right) \\
& = \alpha e_1 + \alpha e_2 \cdot \left(\left((n-1) \cdot \frac{n^2+n}{2} \right) - \left(\frac{1}{2} \left(\frac{2n^3 - 3n^2 + n}{6} + \frac{n^2-n}{2} \right) \right) \right) = \\
& = \alpha e_1 + \alpha e_2 \cdot \left(\left(\frac{n^3-n}{2} \right) - \left(\frac{n^3-n}{6} \right) \right) = \\
& = \alpha e_1 + \alpha e_2 \cdot \left(\frac{n^3-n}{3} \right) \\
& = \alpha e_1 + \left(\alpha e_2 \cdot \frac{n^3}{3} - \alpha e_2 \frac{n}{3} \right) = \\
& = \alpha e_1 + \alpha e_2 \frac{n^3}{3} - \alpha e_2 \frac{n}{3} = \\
& \boxed{= \alpha e_1 + n^3 \frac{\alpha e_2}{3} - n \frac{\alpha e_2}{3}} = \tau(n)
\end{aligned}$$