

NOME: FELIPE ANCHANDO DA CUNHA MONDES

LISTA 2

②

$$\begin{aligned} a) \sum_{i=1}^n 3i &= 3 \cdot 1 + 3 \cdot 2 + 3 \cdot 3 + \dots + 3 \cdot n \\ &= 3(1 + 2 + 3 + \dots + n) \\ &= 3 \frac{n(n+1)}{2} \\ &= \frac{3n(n+1)}{2} // \end{aligned}$$

$$\begin{aligned} b) \sum_{i=1}^n (n+1) &= (1+1) + (2+1) + (3+1) + \dots + (n+1) \\ &= 1 \cdot n + (1 + 2 + 3 + \dots + n) \\ &= n + \frac{n(n+1)}{2} // \end{aligned}$$

$$\begin{aligned} c) \sum_{i=1}^n (i-1) &= (1-1) + (2-1) + (3-1) + \dots + (n-1) \\ &= \frac{n(n+1)}{2} - n \end{aligned}$$

$$\begin{aligned} d) \sum_{i=1}^{\lg(n)} (2n+1) &= \lg(n) \cdot (2n+1) // \end{aligned}$$

$$\begin{aligned} e) \sum_{i=1}^{\lg(n)} (2n+i) &= (2n+1) + (2n+2) + \dots + (2n+\lg(n)) \\ &= 2n \cdot \lg(n) + (1 + 2 + 3 + \dots + \lg(n)) \\ &= 2n \lg(n) + \frac{\lg(n)(\lg(n)+1)}{2} // \end{aligned}$$

$$\begin{aligned}
 f) \sum_{i=0}^{\lg(n)} 2^i &= 2^{\lg(n)+1} - 1 \\
 &= 2^{\lg(n)+1} - 1 \\
 &= 2 \cdot 2^{\lg(n)} - 1 \\
 &= 2 \cdot n - 1 \\
 &= 2n - 1 //
 \end{aligned}$$

$$\begin{aligned}
 g) \sum_{i=0}^{\lg(n)} \left(\frac{3}{16}\right)^i &= \frac{\left(\frac{3}{16}\right)^{\lg(n)+1} - 1}{\frac{3}{16} - 1} \\
 &= \frac{n^{\lg(3/16)} - 1}{\frac{3}{16} - 1} = \frac{n^{(\lg 3 - \lg 16)} - 1}{\frac{-13}{16}} \\
 &= \frac{n^{(\lg 3 - 4)} - 1}{\frac{-13}{16}} //
 \end{aligned}$$

$$h) \sum_{i=0}^{n-1} 2^i = \frac{2^{n-1+1} - 1}{2 - 1} = 2^n - 1 //$$

$$i) \sum_{i=0}^{\lg(n)} \frac{i}{2^i} = \frac{0}{2^0} + \frac{1}{2^1} + \frac{2}{2^2} + \frac{3}{2^3} + \dots + \frac{\lg(n)}{2^{\lg(n)}}$$

$$= 1 + 0 + 1 + \dots + \frac{\lg(n)}{2^{\lg(n)}}$$

$$=$$