$$\frac{1}{3}(n+1)(n-2) - S = \Theta(n^2)$$

$$c_1 n^2 \leq \frac{1}{3}(n^2 - n - 2) - S \leq c_2 n^2$$

$\hookrightarrow c_2 = 1$

$$c_1 n^2 \leq \underbrace{\frac{1}{3}n^{\text{torta}}}_{} \quad \frac{1}{3}n - \frac{2}{3} - S \leq n^2 \qquad + a$$

$$\frac{1}{2}$$

$$\boxed{\frac{1}{3}n^2} - \frac{1}{3}n - \frac{17}{2} \leq n^2 \qquad \text{torta}$$

$$\frac{1}{3}n \leq \frac{1}{4}\left(\frac{1}{3}n^2\right) \qquad \boxed{4 \leq n} \qquad 11 \leq n$$

$$\qquad\qquad\qquad\qquad\qquad\qquad\qquad n_0 = 11$$

$$\frac{17}{2} \leq \frac{1}{4}\left(\frac{1}{3}n^2\right) \longrightarrow 6 \times 17 \leq n^2$$

$$\sqrt{6 \times 17} \leq n \implies 11 \leq n$$

$$\frac{1}{3}n^2 - \frac{1}{3}n - \frac{17}{2} \geq \frac{1}{3}n^2 - \frac{1}{4}\left(\frac{1}{3}n^2\right) - \frac{1}{4}\left(\frac{1}{3}n^2\right)$$

$$n^2\left(\frac{1}{4\cdot3} - \frac{1}{12} - \frac{1}{12}\right)$$

$$\boxed{\frac{1}{6}n^2} \qquad c_1 = \frac{1}{6} \qquad \boxed{n \geq 11}$$

$$\lg n! = \Omega(n \lg n)$$

$$\boxed{n!} \quad n^{\cdot} \quad \rightarrow \quad \sum$$

$$C \, \boxed{n} \lg n \leq \lg n!$$

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

$$\boxed{n < n!}$$

$$\lg n \leqq \lg(n!)$$

$$\xi \; \frac{n}{2} \lg n \geqslant \sum_{i=\frac{n}{2}+1}^{n} \lg(i) \; ?$$