(d) $n + 2n \log_3 n \leq c\, n \log n$

BASE $n = 2 \quad c = 3$

$2 + 2 \cdot 2 \cdot 1 \leq 3 \cdot 2 \cdot 1$

IN GENERALE $n \geq 2$

$(n+1) + 2(n+1) \log_3 n+1 \leq c\,(n+1) \log(n+1)$

$(n+1)(1 + 2\log_3 n+1) \leq c\,(n+1) \log(n+1)$

$1 + 2\log_3 n+1 \leq c \log(n+1)$

quindi $c = 3$

ESERCIZIO 12 - 2° parte

```
MERGESORT (A[1..n])
IF |A| = 1  return A else
    A1 = MERGESORT (A[1..n/2])
    A2 = MERGESORT (A[n/2+1..n])
    MERGE (A1, A2)
```

→ ALGORITMO MERGESORT BASE

```
MERGESORT2 (A[1..n])
IF |A|=1 return A else
    A1 = MERGESORT2(A[1..n/3])
    A2 = MERGESORT2 (A[(n/3)+1..2(n/3)])
    A3 = MERGESORT2 (A[2(n/3)+1..n])
    B = MERGE (A1, A2)
    RETURN (MERGE (B, A3))
```

$$T(n) = \begin{cases} c & \text{se } n = 1 \\ 3T(n/3) + \underbrace{\theta(n_1+n_2) + \theta(n_1+n_3)}_{\theta(n)} & \end{cases}$$

$T(n) = \theta(n \log n)$

$a = 3 \quad c = 3 \quad k = 1 \quad c = dk$