1) $\sum_{i=1}^{n/2} \left(\sum_{j=1}^{n} n + 1 \right) =$ → pienso a $x = x + 1$ como una cte (1)

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

$= \frac{n^3}{2} + \frac{n}{2} = \left(\frac{1}{2}\right) n^3 + \left(\frac{1}{2}\right) n$ → RES 4

2) solo la $\underset{+1}{1}$ → res 1

3) $\log_2(128) = 8$ RES 3

4) $T(n) = \begin{cases} 1 & n = 1 \\ 9 + T\left(\frac{n}{3}\right) + n^2 & n >= 2 \end{cases}$

paso (1) $9T\left(\frac{n}{3}\right) + n^2$

paso (2) $9\left[9T\left(\frac{n}{9}\right) + \left(\frac{n}{3}\right)^2\right] + n^2 =$

$= 81\, T\left(\frac{n}{9}\right) + n^2 + n^2 =$

$= 81\, T\left(\frac{n}{9}\right) + 2n^2$

paso (i) $9^i\, T\left(\frac{n}{3^i}\right) + i n^2$

caso base

$$\frac{n}{3^i} = 1 \qquad n = 3^i$$

$$n = 3^i \qquad n^2 = (3^i)^2 = (3^2)^i = 9^i$$

$$\log_3(n) = i$$

reemplazo i

$$n^2 T\left(\frac{n}{3^{\log_3(n)}}\right) + \log_3(n) \cdot n^2 =$$

$$= n^2 T(1) + \log_3(n) \cdot n^2 =$$

$$= n^2 + \log_3(n) \cdot n^2$$

$$O\left(n^2 \log_3(n)\right)$$ RES 1

5) $$T(n) = \sum_{i=1}^{n} \left(\sum_{j=1}^{n} \left(\sum_{k=1}^{n} 1 \right) \right) =$$

$$= \boxed{n^3 \cdot 1} = T(n)$$

si $n = 10000 \rightarrow T(10000) = 10000^3 = 10^{12}$ ↓ en 1 hora

1 hora —— 10^{12}

64 —— $\boxed{64 \times 10^{12}} = n^3 =$

$$= \sqrt[3]{64 \times 10^{12}} = \sqrt[3]{64} * \sqrt[3]{10^{12}} =$$

$$\boxed{4 \cdot 10^4} = n$$ RES 5

$$T(4) = c^2 \cdot T(2) + 2 =$$

$$= c^2 \cdot [c^2 + (1) + 1] + 2 =$$

$$= c^2 \cdot [c^2 \cdot c + 1] + 2 =$$

$$= c^2 [c^3 + 1] + 2 =$$

$$= \boxed{c^5 + c^2 + 2}$$

$\Rightarrow$ es 4

4) $T(n) =$ cte +

Tiempo	while	caso base
1	$1 = 5^0$	$5^{i-1} = n^3$
2	$5 = 5^1$	$i-1 = \log_5(n^3)$
3	$25 = 5^2$	
i	5^{i-1}	

TIEMPO FOR si $n = 10, 9$

i	10	9	se hace
2	4	6	$\frac{n}{3}$
3	4	3	si n es potencia de 3
4	1	0	y $\frac{n}{3} + 1$ si no lo es

$$T(n) = 1 + \sum_{j=1}^{\log_3(n^3)} \left[\sum_{i=1}^{\frac{n}{3}} (1) + 1 \right] =$$

$$= 1 + \sum_{j=1}^{\log_3(n^3)} \left[\frac{n}{3} + 1 \right] =$$

$$= 1 + \log_3(n^3) \cdot \left[\frac{n}{3} + 1 \right] =$$

$$= 1 + \log_3(n^3) \cdot \frac{n}{3} + \log_3(n^3) = T(n)$$

$$O(\log_3(n^3) \cdot n) \rightarrow \text{es } 4$$