

$$5\left(\frac{n}{3}\right)^{1.2} \leq C 17n^{1.2}$$

$$\frac{5}{17} \left(\frac{n}{3}\right)^{1.2} \leq C$$

$$\frac{5}{17} \times \left(\frac{1}{3}\right)^{1.2} \leq C$$

$$0.078 \leq C$$

or $\log_3 5 = 0.6309$
 $17n^{1.2} = 0(\log_3 5)$
 \downarrow for $\epsilon = 0.279$
 $C \geq 0.078$

for C between 0.078 and ∞
 not including ∞ or less
 then $\downarrow T(n) = \theta(17n^{1.2})$

$$c) T(n) = 12T(n/2) + n^2 \lg n = \theta(\frac{n^2 \lg n}{\lg 3^5})$$

~~Base case~~

$$T(n) = \theta(n^4)$$

Base cases

$$T(1) = 12\left(\frac{1}{2}\right)^4 + 1 \times 0$$

$$= 12 \times \frac{1}{16} = \frac{12}{16} = 0.75$$

$$T(n) = 12c\left(\frac{n}{2}\right)^4 + n^2 \lg n = \frac{12cn^4}{16} + n^2 \lg n$$

$$= \frac{3}{4}cn^4 + n^2 \lg n \leq cn^4$$

$$T(n) \in O(n^4)$$

$$T(n) = O(n^4) = \frac{3}{4}cn^4 + n^2 \lg n \leq cn^4$$

so, ~~tightest~~ upper bound

tightest is $O(n^4)$ for $T(n)$ or $T(n) = O(n^4)$

$$c^2 a \frac{1}{2} \times 0.25 \quad 25 + 0.25 \times 0.25 \times 0.25 \times 0.25 = 0.25$$