03번

① $h(n) = n^{\log_3 3} = n$

$f(n) = \sqrt{n}$

$h(n) > f(n)$

$\therefore \theta(n)$

② $h(n) = n^{\log_2 1}$ $f(n) = n$

$h(n) < f(n)$

$\therefore \theta(n)$

③

$T(n) = 2T(n-1) + 2$

$= 2(2T(\frac{n}{2}-1)+2) + 2$

$= 4T(\frac{n}{2}-1) + 6$

$= 2^k T(\frac{n}{2^k}-1) +$ 상수

$= 2^k T(1) +$ 상수 $= n$?

④ $T_n = 3T(\frac{n}{3}+15) + \theta(n)$

$= 3(3T(\frac{n}{6}+15) + \theta(\frac{n}{3})) + \theta(n)$

$= 9T(\frac{n}{6}+15) + \theta(n) + \theta(\frac{n}{3})$

$= 3^k T(\frac{n}{3 \times k}+15) + \theta(n) + \theta(\frac{n}{3}) + \cdots$

⑤ $T(n) = 2T(\frac{n}{2}) + \theta(n\log_2 n)$

$a=2 \quad b=2$

$h(n) = n^{\log_2 2} = n^{\log_b a} = n$

$f(n) = \theta(n\log_2 n)$

$\frac{f(n)}{h(n)} = \frac{\theta(n\log_2 n)}{n} \qquad f(n) > h(n)$

$\therefore \theta(\theta(n\log_2 n))$

⑥ $T(n) = 10T(\frac{n}{15}) + b$

$h(n) = n^{\log_b a} = n^{\log_{15} 10}$

$f(n) = b$

$\therefore \frac{f(n)}{h(n)} = \frac{b}{n^{\log_a b}} \qquad f(n) < h(n)$

$\therefore \theta(n^{\log_{15} 10})$

⑦ $T(n) = 5T(\frac{n}{6} + 100) + n.$

07번 $f(n) = T(\frac{n}{3}) + n^2$

$h(n) = n^{\log_3 1} < f(n) = n^2$

$\therefore \theta(n^2)$

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09 번

$T(n) = T(\frac{n}{2}) + \frac{n}{2}$

$h(n) = n^{\log_2 1}$

$F(n) = \frac{n}{2}$

$\therefore \frac{F(n)}{h(n)} = \frac{\frac{n}{2}}{n^{\log_2 1}} \qquad F(n) > h(n) \therefore \theta(\frac{n}{2})$

11번

$T(n) = 3T\left(\frac{n}{3}\right) + k$ (상수)

$h(n) = n^{\log_3 3} = n$

$f(n) = k$

$\therefore \theta(n)$

13번

$T\left(\underbrace{\frac{n}{2}+3}\right)$ + 상수?

$= T\left(\frac{n}{6}+\frac{3}{2}\right)$ + 상수

$= T\left(\underbrace{\frac{n}{2\times3^k}+\frac{3}{2^k}}\right)$ + 상수