Tutorial_3

Find Big-O, C and n_0 for

① $5n^6 + 4n^3 - 2n^2 + 1 = O(n^6)$

$c = 5+4+2+1 = 12$

$n_0 = 1$

② $\log(\boxed{n^7 + 2n^3 - 10})$

$n^7 + 2n^3 - 10 \leq 13n^7$ for all $n \geq 1$

so $\log(n^7 + 2n^3 - 10) \leq \log(13n^7)$

$= \log 13 + 7\log n$

$\leq 8 \log n$ True if $n \geq 13$

Thus

$\log(n^7 + 2n^3 - 10) = O(\log n)$

$c = 8$

$n_0 = \max(1, 13) = 13$

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③ for Ω of $\log(n^7 + 2n^3 - 10)$

we have

$\log(\boxed{n^7 + 2n^3 - 10})$

$n^7 + 2n^3 - 10 \geq \frac{1}{2}n^7$ for $n_0 \geq \frac{2+10}{1-1/2} = 24$

$\log(n^7 + 2n^3 - 10) \geq \log(\frac{1}{2}n^7)$

$= \log\frac{1}{2} + 7\log n$

$= -1 + 7\log n$

$\geq 6 \log n$ True if $n \geq 2$

$\Rightarrow \log(n^7 + 2n^3 - 10) = \Omega(\log n)$

$c = 6$ $n_0 = \max(24, 2) = 24$