Doubt Clearing Session

Complete Course on Algorithm for GATE - CS & IT

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④ $\log_{20} n > \log_{30} n$

$$\frac{\log_{20} n}{\log_{30} n} = \frac{\log_{20} n}{\log_{20} 30} = \frac{\log_{20} n}{1.5}$$

$\log_2 n = \Theta(\log_3 n)$

$\log_{10} a = \frac{\log_2 a}{\log_2 10}$

$\log_{10} 100 = \log_2 100$

$\log_2 5 < 3$

$\log_2 100 > 6$

(5) 2^n 3^n

$2^n \cdot 1$ $(2 \times 1.5)^n$

$2^n \times (1.5)^n$

$2^n = O(3^n)$

$c^n = c(3^n)$

$c^n = O(3^n)$

Stirling $n!$

(B) ① $2^n = O(n^n)$ ✗, ✗, ✗

② $n! = O(n^n)$ ✗, ✗

$\sqrt{2\pi n}\left(\frac{n}{e}\right)^n$

③ $\log(n!)$ $\quad$ $\Omega(n^n)$

$\log\left(\sqrt{2\pi n}\cdot\left(\frac{n}{e}\right)^n\right)$ $\quad$ $n\log n$

$\log(\sqrt{2\pi n}) + n\log\left(\frac{n}{e}\right)$

$\frac{1}{2}\log(2\pi n) + n\log n - n\log e$

$\Omega n + n\log n$

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

(6) (1) $n! = O(n^n)$, ~~Ω~~ ~~Θ~~

(2) $\log(n!) = \Theta(\log(n^n))$, O, Ω becz of Stirling

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(7)

② T/F

ⓐ $1000 \cdot n\log n = O\left(\frac{n\log n}{1000}\right)$ ✓

ⓑ ~~$\sqrt{\log n} = \Theta(\log(\log n))$~~ ✗

ⓒ If $0 < x < y$ then $n^x = O(n^y)$ ✓

ⓓ $2^n \neq O(n^x)$ where x is constant ✓

1	log(log n)	log n	√n	n	n log n	$n^{3/2}$	n·n
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
						$n^{1.5}$	n^2

(£)

(9) T/F

(a) $\frac{4^n}{2^n} = \Theta(2^n)$

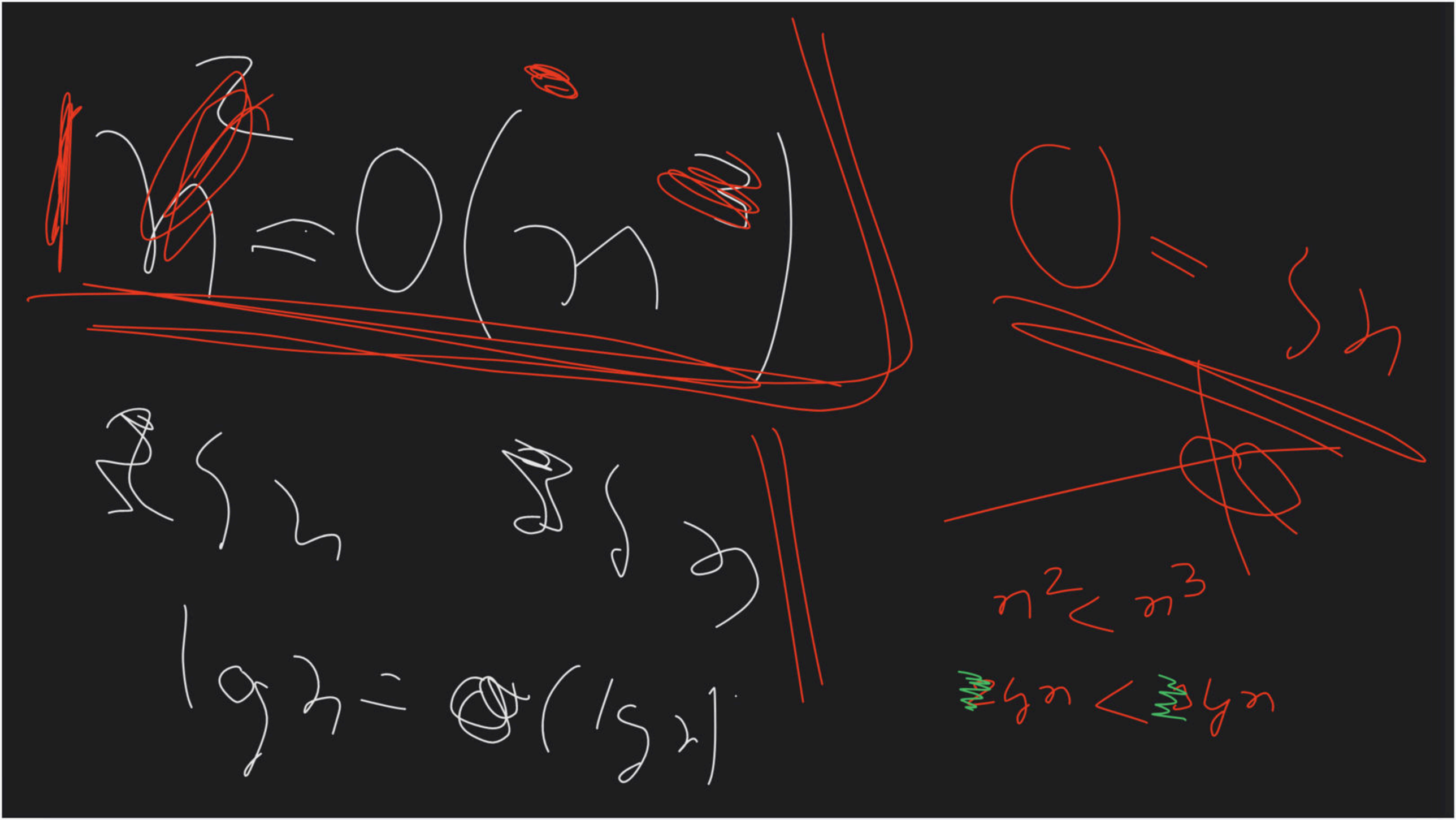
(b) $n \cdot 64^{\log_2 n} = \Theta(n^{10})$

(c) $f(n) = \Theta(f(n))$

(d) $f(n) = \Theta\left(\frac{f(n)}{2}\right)$

$(1/2)^n \Rightarrow 2^n$

$a^{\log_c b} = b^{\log_c a}$



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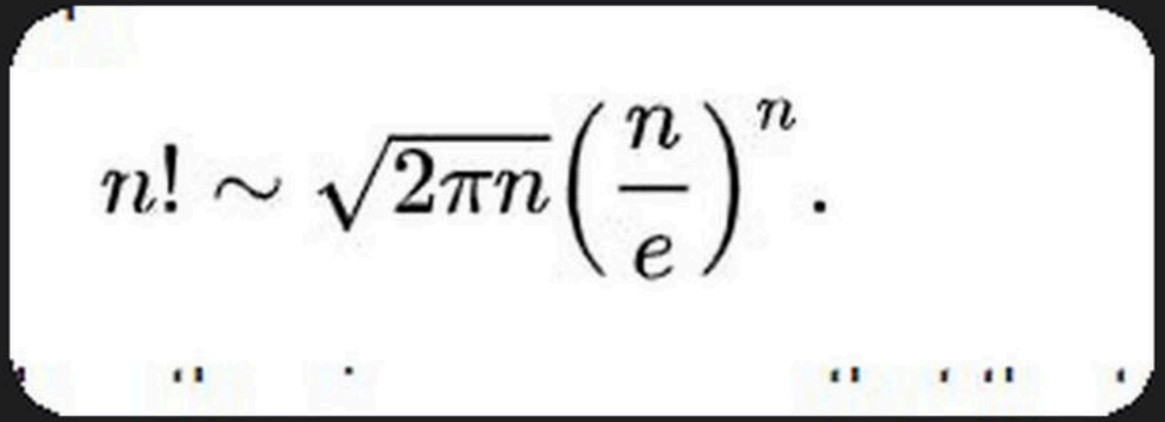
▲ 1 • Asked by Akash

Please help me with this doubt



$$n! \sim \sqrt{2\pi n}\left(\frac{n}{e}\right)^n .$$