Information

These questions reiterate previous material about the analysis of algorithms.

Question 1

Answer saved

Marked out of 1.00

Compute, preferably in your head, $(\log_2(2^{1000} \cdot 8^{100}))$.

Answer: 1300

Question 2

Answer saved

Marked out of 1.00

Whenever a new, eagerly awaited volume of the epic multi-volume young adult fantasy saga *À La Recherche du Temps Perdu* hits the bookstores, young Marcel re-reads all the previous volumes in preparation. Alas, typically he falters in his resolve and only manages half of them. To be precise, when volume $(i+1)$ arrives, he re-reads volumes $1, \ldots, \lceil i/2 \rceil$.

How many books has he read (including re-reads) when the $n$th volume is published? (Among the big-Oh estimates, choose the smallest one.)

- ○ a. $O(\log n)$
- ○ b. $O(\sqrt{n})$
- ○ c. $O(n)$
- ○ d. $O(n \log n)$
- ● e. $O(n^2)$

Clear my choice

Question 3

Answer saved

Marked out of 1.00

Pick, for each sum, the same expression in $\cdots$-notation, its closed form or approximation, and a useful way to remember that closed form.

(*Correction*: The sum on the top left should say $\sum_{i=0}^{n} \frac{1}{2^i}$, i.e., run from $i = 0$ rather than $i = 1$.)

$\sum_{i=1}^{n} \frac{1}{2^i}$

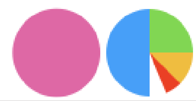
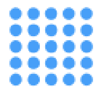
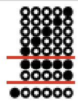
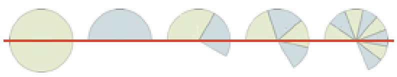
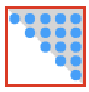
$\sum_{i=1}^{n} 1$

$\sum_{i=1}^{n} i$

$\sum_{i=0}^{n} 2^i$

$\sum_{i=1}^{n} n$

$\sum_{i=1}^{n} \frac{1}{i}$

| | | |
|---|---|---|
| $\frac{1}{1} + \frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \cdots + \frac{1}{2^n}$ | $\sim \frac{1}{2}n^2$ |  |
| $1 + 1 + \cdots + 1$ | $\sim 2$ |  |
| $1 + 2 + 3 + \cdots + n$ | $= n$ |  |
| $1 + 2 + 4 + 8 + \cdots + 2^n$ | $= n^2$ |  |
| $n + n + \cdots + n$ | $= 2^{n+1} - 1$ |  |
| $\frac{1}{1} + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \frac{1}{5} + \cdots + \frac{1}{n}$ | $\sim \ln n$ |  |