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2.

a. $\int_1^n ln(i)di \rightarrow [iln(i) - i]_1^n \rightarrow nln(n) - n - (1ln(1) - 1) = nln(n) - n + 1$ which is essentially $= nln(n) + O(n)$

b. $\int_1^n iln(i)di \rightarrow IBP \rightarrow u = ln(i),\ v' = i \rightarrow \left[.5i^2 ln(i) - \int .5idi \right]_1^n \rightarrow$

$.5n^2 ln(n) - .25n^2 - (5(1)^2 ln(1) - .25(1)^2) \rightarrow .5n^2 ln(n) - .25n^2 + .25 = .5n^2 ln(n) + O(n^2)$