

Math 1B Discussion Problems

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Instructions

1. Introduce yourselves! Despite popular belief, math is in fact a team sport!
2. Find some blackboard space, a piece of chalk, and decide who will be your first scribe.
3. Do the problems below, having a different person be the scribe for each one.

Problems

1. What is $\lim_{x \rightarrow \infty} \sqrt{\frac{16x^3 + 2x - 1}{4x^3 + 1}} - e^{-x}$
2. Differentiate each of the following:
 - $(x^3 + 2)(x^6 - 10)$
 - $\frac{3x-1}{2x+1}$
 - $e^{\sin(x)}$
3. Find each of the following:
 - $\int x^4 + \cos(x) dx$
 - $\int \frac{\ln x}{x} dx$
 - The area under the curve $y = xe^{x^2}$ between $x = 0$ and $x = 2$
4. Find each of the following:
 - $\int \sqrt{t} \ln(t) dt$
 - $\int_1^e x^3 \ln(x) dx$
 - $\int \sin(x) \cos(x) \ln(\sin(x)) dx$
 - $\int_0^{\sqrt{3}} \tan^{-1}(1/x) dx$
 - $\int e^{ax} \sin x dx$, where a is any real number.
5. What's wrong with the following "proof" that $0=1$?

$$\ln x = \int \frac{1}{x} = \frac{1}{x}x - \int -\frac{1}{x^2}x = 1 + \int \frac{1}{x} = 1 + \ln x$$