Math 1B Discussion Section Problems

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You should work on the following problems in groups of 3 or 4. Try to get through as many as you can, but you aren't expected to finish everything. Instead, you should make sure everyone in your group knows **how** to solve all the problems, and not just the answers.

1. Find a partial fraction decomposition for $\frac{4x^3-7x^2-x+16}{(x-2)^2(x^2+x+3)}$
2. Find $\int \frac{x+1}{x^2+x+4}dx$
3. (a) Compute $\int_0^1 \frac{1}{1+x^2}dx$ directly
   (b) Now approximate the integral using the trapezoid rule with $n = 4$
   (c) What is the error of this approximation?
   (d) What error bound does the Trapezoid rule error bound give you?
4. How many subdivisions do you need to approximate $\int_0^2 e^{-x^2}dx$ to within 10^{-5}
   - Using the trapezoid rule?
   - Using the midpoint rule?
5. For each of the following rules, draw a non-constant, continuous function (but not necessarily differentiable) function whose integral would be best approximated by that rule when using $n = 4$ and the interval $[a, b] = [0, 4]$. You should pick your functions so that using any other rule would give a very bad estimate.
   - Left Endpoint rule
   - Right Endpoint rule
   - Midpoint rule
   - Trapezoid rule