Math 1220
Exam 2

Name:
Date:

Please read the directions carefully. There are 7 problems. You only need to complete 6 of them. Please clearly label which one you don't want graded by putting an X through the problem number. You can earn 5 extra credit points by CORRECTLY answering this extra problem (the one you labeled with an X).

To earn full credit, you must show all of your work or justify your solutions.

1. Evaluate the following integral:

$$\int x^2 \sin(x) \, dx$$

2. Evaluate the following integral:

$$\int \sin^2(x)\cos^3(x) \ dx$$

3. Evaluate the following integral. If it converges, find the value:

$$\int_0^\infty x\,e^{-x}\,dx$$

4. Show that the following equation is true by evaluating the integral (Hint: It is easier to evaluate by changing your limits of integration when you do your substitution).

$$\int_0^2 \frac{1}{\left(16 - x^2\right)^{3/2}} \, dx = \frac{\sqrt{3}}{48}$$

5. Evaluate the following integral

$$\int \frac{x+1}{x^2+x-2}\, dx$$

6. Evaluate the following integral or prove that it diverges:

$$\int_2^3 \frac{1}{(x-2)^2}\, dx$$

7. Find the explicit solution to the following initial value problem ("explicit" means your answer looks like "y=f(t)"):

$$\frac{dy}{dt} = 2 - y, \quad y(0) = 3$$