## Electricity and Magnetism 1 [3811] Practice Midterm 1

## Directions:

This exam is closed book. You are allowed a copy of the equation sheet posted on the course website. You may annotate your equation sheet.

Read all the questions carefully and answer every part of each question. Show your work on all problems – partial credit may be granted for correct logic or intermediate steps, even if your final answer is incorrect.

Unless otherwise instructed, express your answers in terms of fundamental constants like  $\varepsilon_0$ , rather than calculating numerical values.

If the question asks for an explanation, write at least one full sentence explaining your reasoning.

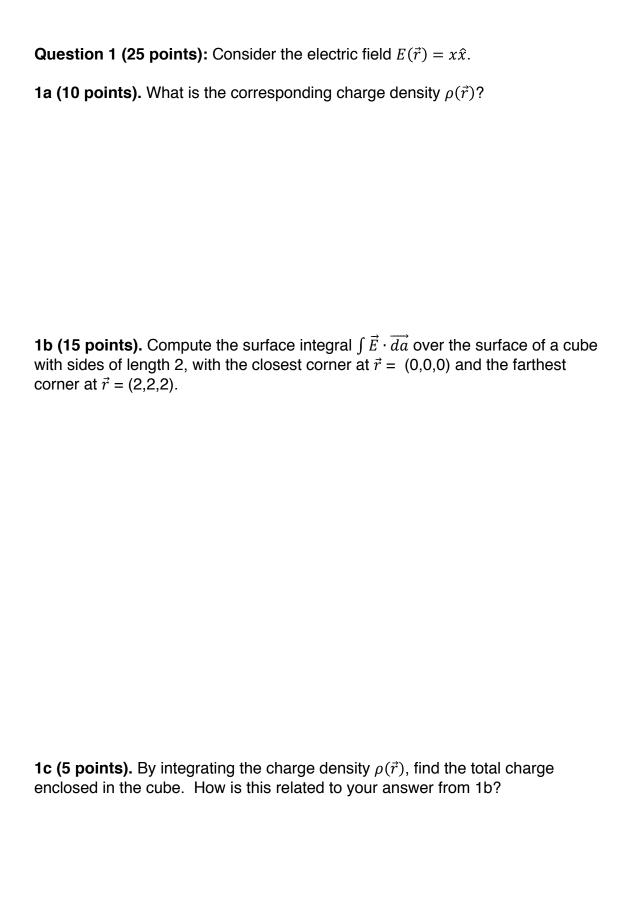
Please ask if you have any questions, including clarification about the instructions, during the exam.

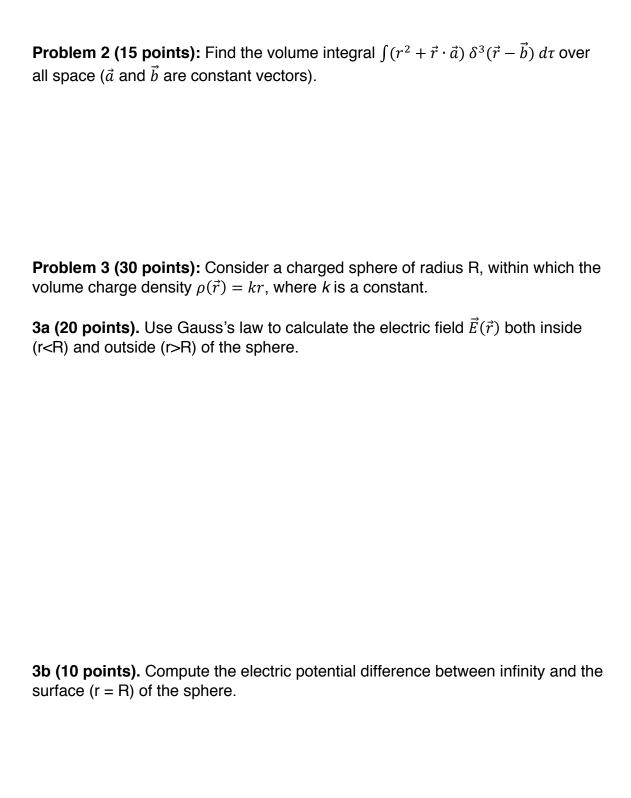
This test is designed to be gender and race neutral.

## Good luck!

**Honor Pledge:** I understand that sharing information with anyone during this exam by talking, looking at someone else's test, or any other form of communication, will be interpreted as evidence of cheating. I also understand that if I am caught cheating, the result will be no credit (0 points) for this test, and disciplinary action may result.

Sign Your Name		 
_		
Print Your Name		





<b>Problem 4 (30 points).</b> Consider an infinitely long charged cylinder with radius R, within which the electric potential $V(\vec{r}) = s \sin \phi$ (where s is the radial coordinate from the center of the cylinder).
4a (15 points). Compute the electric field inside the cylinder.
<b>4b (15 points).</b> Compute the total electrostatic energy per unit length W/L inside the cylinder.