3)

- My thought process was that because the sphere already has positive horizontal velocity, it would continue in that direction and gain horizontal distance to the right. Because the sphere was negatively charged, it would be attracted to the upper rod, meaning it would gain vertical height as time passes. I thought the positions would level out due to the sphere leaving the region in the end.

- For question 3, I answered D because while I knew the horizontal and vertical components would be increasing, I thought they would level off at the end since the particle leaves the region.

- The right answer is E. This is the answer because while both vertical and horizontal positions increase, the horizontal position increases at a constant rate; however, the vertical position will have an acceleration vector pointed upwards, meaning its position will increase exponentially.

5)

- I thought that the electric force had to be upwards due to the fact the charge was negative. But I didn't realize that this would mean the field must be downwards.
- For question 5, I had no idea how to derive any of the answer choices, so I randomly chose B since I originally believed the field had to be upwards.
- The correct answer is E. Because the electric force is upwards, then the electric field must be downwards. By setting qE = mg and solving, you get the electric field is 4.9 x 10^4 N/C downward.

6)

- I thought that if we were to increase the distance to 5r, the strength of the electric field would decrease.
- For question 6, I chose A as a guess. I was deciding between B and A, since both had coefficients less than one.

- The correct answer is B, because the strength of the electric field is inversely proportional to the distance. So increasing the distance by a factor of 5 would shrink the field strength by a factor of 5.

7)

- I thought A and B would be the same since they were the only two in between the two rods. I then thought that the farther out the points are, the greater the electric field strength would be.
- I answered B for this question as a random guess. I did not know how to solve this problem.
- The answer is C, as for points C, D, and E, the electric field is constant since edge effects are ignored. For points A and B, the electric field is the same due to the positively charged plates, meaning the electric fields between the plates cancel out and equal zero.

10)

- I thought the answer would have to be negative in order to cancel out the large difference in charge between the two spheres.
- I answered A for this question because I attempted to use the formula q/r^2. I plugged in the distance from the center for each sphere and found that for answer A, the equation yielded the same results.
- The correct answer is C because the answer would have to be negative but closer to the 2uC sphere in order to ensure zero net electric field. Using the equation kq/r^2 and plugging in .2-x for x and using the quadratic equation, we can calculate that the answer is 0.073 m. We discard the –0.273 because it is outside of the two spheres.