Potential Surfaces Final Lab and Report

Physics

The following questions require the use of the Charges and Fields applet from Phet.

Part A *– opposite charges*

Place a +1 nC charge near the top of the screen. Place a -1 nC charge near the bottom of the screen. Use the ruler tool (click "show numbers" first) to measure the distance between the two charges. **Calculate** the answers to the following questions, then test your responses using the applet.

1. What is the E-field at a point exactly halfway between the two charges?
2. What is the electrical potential of that same point halfway between the two charges?

Part B *– same charges*

Replace the -1 nC charge at the bottom of the screen with a +1 nC charge. Again, **calculate** the answers to these questions and test your responses with the applet.

3. What is the E-field at a point exactly halfway between the two charges?
4. What is the electrical potential of that same point halfway between the two charges?

Part C *- analysis*

5. What do your answers to numbers 1 and 2 mean? (Explain each number separately, then relate the two to each other.) Would a charged particle placed at that point accelerate in one direction or another?
6. What do your answers to numbers 3 and 4 mean? (Explain each number separately, then relate the two to each other.) Would a charged particle placed at that point accelerate in one direction or another?
7. Explain why your answers to number 2 and number 4 seem strange (given the acceleration of a charged particle at the relevant points) but are still consistent with the concepts we've discussed in class.