

**Physics 221**  
**Group Project**  
**Force, Electric Field, Potential Energy and Potential**

Names: \_\_\_\_\_

1. A charge of  $-5.2 \text{ nC}$  is at  $-3.00 \text{ m}$  on the  $x$ -axis. A second charge of  $2.60 \text{ nC}$  is placed at  $3.00 \text{ m}$  on the  $x$ -axis. A  $1.0 \text{ nC}$  charge is placed at the origin.
  - a. Find the force on the charge at the origin.
  - b. Find the electric field on the charge at the origin.
  - c. Find the electric potential at the origin if the  $1.0 \text{ nC}$  charge is not present.
  - d. Find the electric potential energy of the charge at the origin with respect to a point infinitely far away where there is no electric field from the two charges.
  
2. Repeat a – d if the  $1.0 \text{ nC}$  charge at the origin is replaced with a  $-1.0 \text{ nC}$  charge.
  
3. Compare and contrast your results in each section of #1 and #2 above.
  - a. Explain what the answer for each part is telling you conceptually
  - b. Describe what the sign indicates in each case.
  - c. Explain why the answer is the same or different for each part when the sign of the charge at the origin is changed (#1 compared to #2).