

**Physics 122: Practice Problem of the Day****Problem #02: Coulomb's Law and Point Particles**

Wednesday, 14 Jan 2008



Three charged point particles are placed in fixed positions in a perfectly straight line as shown above. The particles labeled “1”, “2”, and “3” have a charge values of  $+30.0 \mu\text{C}$ ,  $-40.0 \mu\text{C}$ , and  $+70.0 \mu\text{C}$  respectively. The distance between charge “1” and “2” is 5.0 cm and the distance between charge “2” and “3” is 10.0 cm.

**Part (a)** – Rank the three charges (from lowest to highest) in terms of the *magnitude* of the total electrostatic **field** applied at the given position due to the other two charges. Explain your work.

**Part (b)** – Rank the three charges (from lowest to highest) in terms of the *magnitude* of the total electrostatic **force** on each charge. Explain your work.

**Part (c)** – You have a fourth charge labeled “4” that you can place exactly half way between charges “2” and “3”. Is it possible to select a charge value for particle “4” that results in zero net force being applied to particle “1”? If so, what is that value?