Lecture 8 - Electrostatic Potential
Chapter 28 - Thursday February 1st

- Review of electrostatic potential
- More example problems
- Equipotential surfaces
- Conductors (time permitting)

Reading: pages 635 thru 670 (chapter 28/29) in HRK
Read and understand the sample problems
WebAssign homework: set 3, due Sun. 4th at 11:59pm
Graded problems (Ch. 28) – Ex. 2, 12, 16, 24; Prob. 6, 13
Practice problems (Ch. 28): Ex. 29, 31, 43, 47; Prob. 15

- ***Exam 1, Feb 6th, 8:30 – 10:10 am (Chs. 25-29)***
- ***Review in here tonight and Monday at 5:30pm***

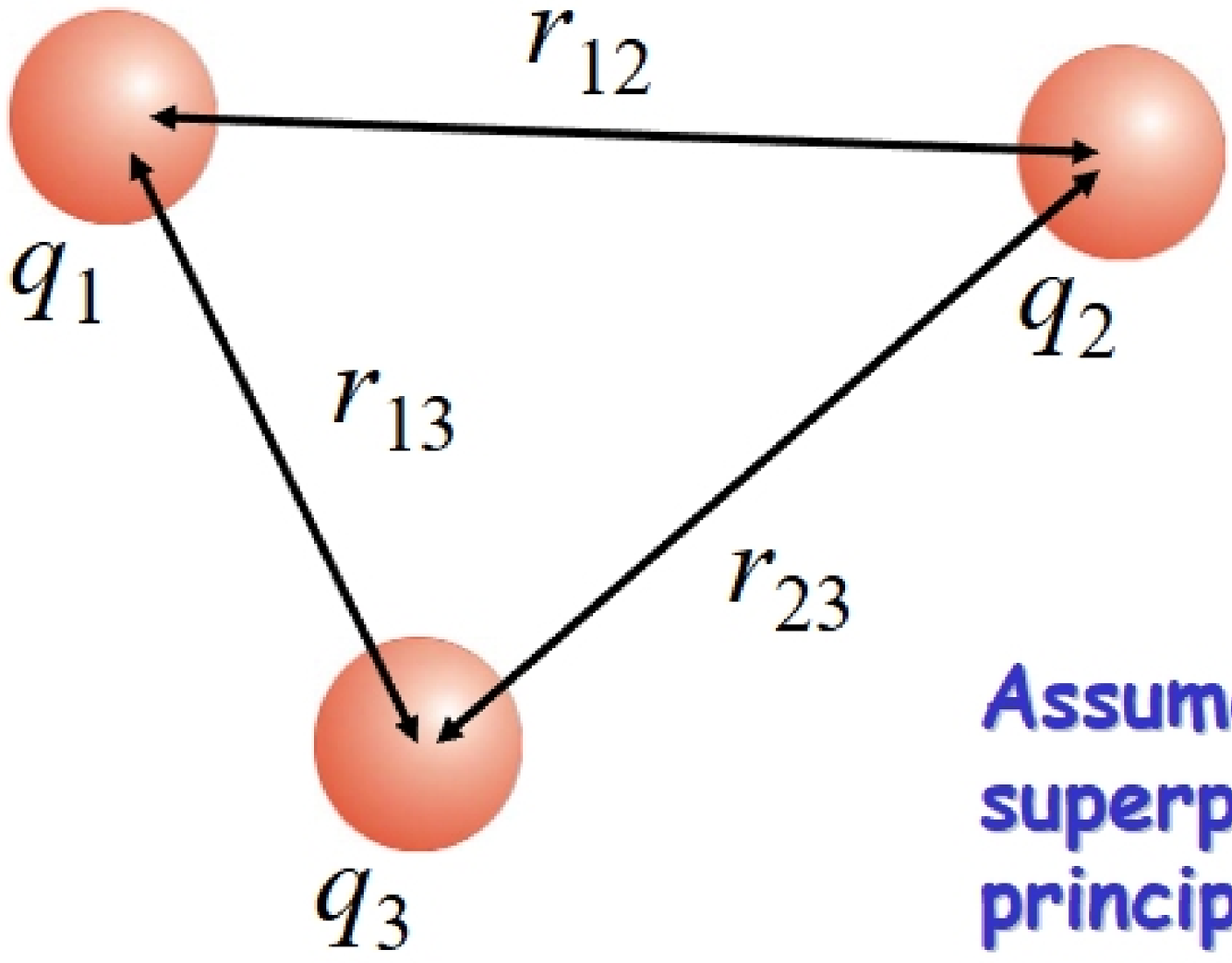
Electrostatic Potential Energy

- ***The potential energy is a property of both of the charges, not one or the other.***
- ***If we choose a reference such that $U = 0$ when the charges are infinitely far apart, then we can simplify the expression for the potential energy as follows.***

$$U(r) = -\int_{\infty}^{r} \vec{\mathbf{F}} \cdot d\vec{\mathbf{s}} = +\frac{1}{4\pi\varepsilon_o} q_1 q_2 \left(\frac{1}{r} - \frac{1}{\infty} \right) = \frac{1}{4\pi\varepsilon_o} \frac{q_1 q_2}{r}$$

Again, the sign of *U* is not a problem. It is taken care of by the signs of the charges q_1 and q_2.

Potential Energy of a System of Charges



Assumes that the superposition principle is valid

$$U = \frac{1}{4\pi\varepsilon_o}\frac{q_1 q_2}{r_{12}} + \frac{1}{4\pi\varepsilon_o}\frac{q_1 q_3}{r_{13}} + \frac{1}{4\pi\varepsilon_o}\frac{q_2 q_3}{r_{23}}$$