Name: _____ Date: _____

m_r^β Physics Practice: Coulomb's Law Exercises

Coulomb's Law states that for two *signed point charges* q_1 and q_2, separated by a distance d, the magnitude of the electrostatic force on each charge is

$$|F| = k_e \frac{|q_1 q_2|}{d^2}.$$

The direction of the force is *attractive* (towards each other) if the charges have opposite signs, and *repulsive* (away from each other) if the charges have the same sign.

1. What do we mean by *signed point charges*?

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2. What is k_e?

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3. What is the charge of a proton?

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4. What is the charge of an electron?

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5. What is the electrostatic force between two protons that are one billionth of a meter apart?

6. What is the electrostatic force between two electrons that are one billionth of a meter apart?

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7. What is the mass of a proton?

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8. What is the gravitational force between two protons that are one billionth of a meter apart?

9. Which force between the protons is bigger, and by what multiple?

10. Suppose you had two equal stationary charges of the same sign. A much smaller point charge of the same sign is placed midway between the two large charges, and given a small nudge. Sketch field lines, and the path of the small point charge. Hint: study `http://www.mrbenson.org/electric-fields/`.