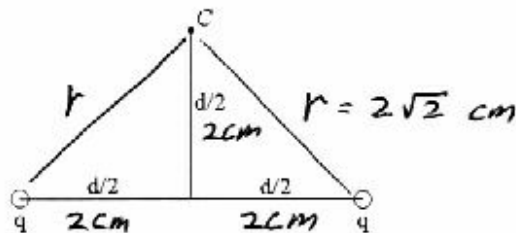


Name: KEY

PHYSICS 2220 - QUIZ #3 - SPRING 2009

1. Two charges $q = -3.0 \mu\text{C}$ are fixed in space a distance $d = 4.0 \text{ cm}$ apart, as shown.

- a. With $V = 0$ at infinity, what is the electric potential at point C?



$$V = k \frac{q}{r} + k \frac{q}{r} = 2k \frac{q}{r}$$

$$\text{So } V = 2 \left(8.99 \times 10^9 \frac{\text{Nm}^2}{\text{C}^2} \right) \frac{(-3 \times 10^{-6} \text{C})}{0.02\sqrt{2} \text{m}}$$
$$= \boxed{-1.91 \times 10^6 \text{V}}$$

- b. You bring a third charge $Q = -2 \mu\text{C}$ from infinity to C. How much work do you do?

Since the work you do is stored as a change in potential energy,

$$W = \Delta U = Q \Delta V = Q (V_f - V_i) \quad \leftarrow V_i = 0 \text{ at } \infty$$

$$\text{Therefore } W = -2 \times 10^{-6} \text{C} (-1.91 \times 10^6 \text{V} - 0)$$
$$= \boxed{3.81 \text{J}}$$