Instructor: Dr. A. Mekki
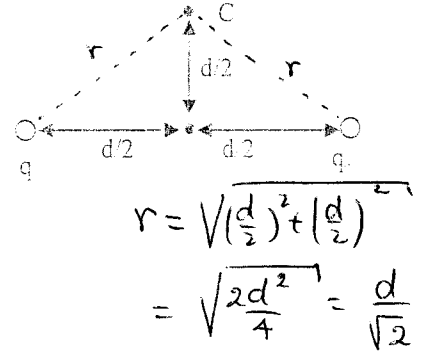
Name: **Key**   Id:

Two charges q = +2.0 μC are fixed a distance d = 2.0 cm apart.
  (a) With V = 0 at infinity, what is the electric potential at point C?
  (b) You bring a third charge q = +2.0 μC from infinity to point C. How
     much work you must do?

a) $V_c = \dfrac{kq}{r} + \dfrac{kq}{r} = \dfrac{2 \times 9 \times 10^9 \times 2 \times 10^{-6}}{\left(\dfrac{0.02}{\sqrt{2}}\right)}$

$= \boxed{2.5 \times 10^6 \text{ V}}$

$r = \sqrt{\left(\dfrac{d}{2}\right)^2 + \left(\dfrac{d}{2}\right)^2}$

$= \sqrt{\dfrac{2d^2}{4}} = \dfrac{d}{\sqrt{2}}$

b) $W = q \, \Delta V = q(V_c - \cancel{V_\infty}^0) = q \, V_c$

$= 2 \times 10^{-6} \times 2.5 \times 10^6 = \boxed{5 \text{ J}}$