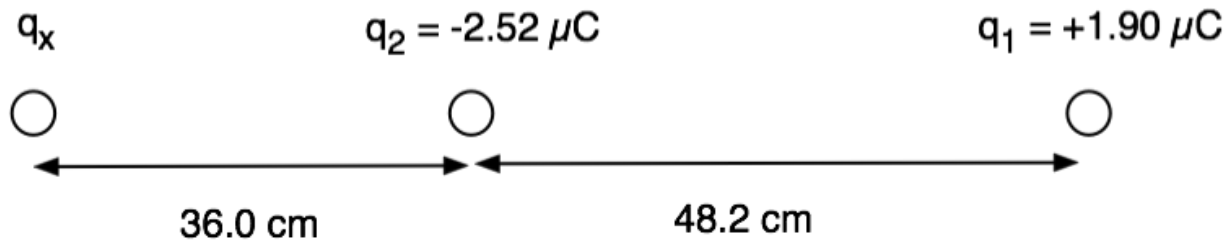


Physics 10164 - Spring 2020 Exam 1A

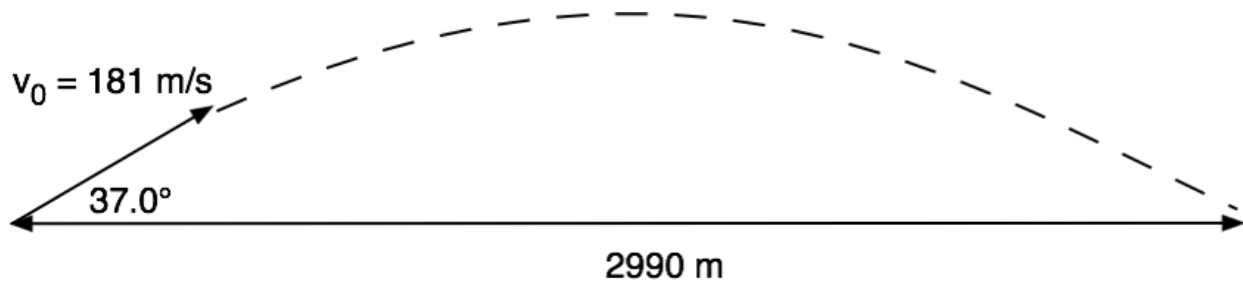
1. (35 pts) Three charges are fixed in place along the x-axis as shown below.

- a) If the electric force on charge q_x is 0.255 N in the $-x$ direction, what is the charge q_x ?
- b) Assume the charge q_2 is at the origin. At what value of x will charge q_x feel no net electric force, besides infinity?



2) (35 pts) A $-25.0\ \mu\text{C}$ charge with a mass of 427 grams is launched in a direction 37.0° above the ground as shown with an initial velocity of 181 m/s. It hits the ground again after traveling a horizontal distance of 2990 meters, and all of the motion takes place within a uniform electric field oriented vertically (either up or down). Assume only the electric force and gravity are relevant.

- a) What is the magnitude and direction of the uniform electric field in which this charge is immersed?
- b) If the voltage at the beginning of its motion is 0 Volts, what is the voltage where it hits the ground again?



3) (30 pts) For the arrangement shown below, calculate the work done by the electric force as charges q_2 and q_4 remain fixed in place while charge q_5 moves from its initial location shown to point x , which is directly above its initial location.

