

7. The work done by a force is the product of the force times the distance through which the force moves. Here we are given the strength of the electric field and the size of the charge, so we can calculate the force using the method employed in the two previous problems. Combining these two relationships allows us to solve the problem.

$$W = F d$$

$$F = E q$$

substituting the expression for F from the second equation into the first equation gives

$$W = E q d$$

$$W = (30 \text{ N / C}) (4.0 \text{ C}) (0.50 \text{ m})$$

$$W = 60 \text{ N m} = 60 \text{ J} \quad \text{because } 1 \text{ J} = 1 \text{ N m}$$