Electric Fields and Potentials

As you work through the steps in the lab procedure, record your experimental values and the results on this worksheet. Use the exact values you record for your data to make later calculations.

Procedure A: Parallel lines

Complete Data Table 1.

Data Table 1

Location	**A**	**B**	**C**	**D**	**E**
Potential (V)					
Distance from the left line (m)					

What is the absolute value of the work done by the electric field on a test charge of -0.8 C as it moves along the paths indicated in Data Table 2 below? (*Note: The value(s) given may be different in the WebAssign question.*)

Data Table 2

Path	**ΔV (V)**	**Displacement d (m)**	**Work (J)**
from A to D			
from A to B			
from B to D			
from A to D via B			
from C to E			

What is the magnitude of the electric field in the region between C and E?

What is the magnitude of the electric field in the region between B and D?

Which of the following correctly describes the nature of the electric field in the region between the two parallel lines? (Select all that apply. *Note: The order of these options may be different in the WebAssign question.*)

- The electric field increases as you go away from the left line toward the right line.
- The electric field lines are parallel to the two lines and equally spaced.
- The electric field decreases as you go away from the left line toward the right line.
- The electric field lines are perpendicular to the two lines and are equally spaced.
- The electric field has the same magnitude at all points in the space between the two lines.

CHECKPOINT 1: Ask your TA to check your field lines and calculations before proceeding.

Procedure B: Point and line

Complete the table below.

Data Table 3

Location	**A**	**B**	**C**	**D**	**E**
ΔV (V)					
Displacement d (m)					
Electric Field E (N/C)					

Use the field lines and equipotential lines you have drawn to indicate if the work done by the electric field in each of the following cases is positive or negative. (*Note*: in the following, "point" refers to the point in the configuration, not to locations A, B, C, D, or E.)
to move an electron to the left from the point:

to move an electron to the right from the point:

to move an electron from the line toward the point:

to move an electron directly up from the point:

to move an electron directly down from the point:

CHECKPOINT 2: Ask your TA to check your field lines and measurements before proceeding.

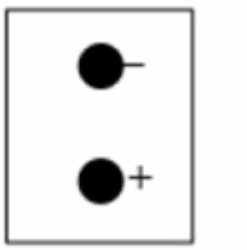
Procedure C: Dipole

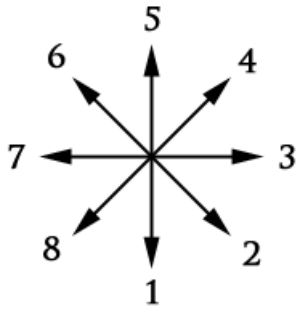
Complete the table below.

Data Table 4

Location	A	B	C	D	E
ΔV (V)					
Displacement d (m)					
Electric Field E (N/C)					

The diagram below shows the orientation of the dipole for Procedure C. Use the direction rosette, when necessary, to answer the following questions.





What is the direction of the electric field at the location C?

Consider a location that is 3 fiducial marks directly below the negative electrode. What is the direction of the electric field at this location?

What will be the magnitude of the electric field at this location compared to the magnitude of the field at location C?

Consider a location that is 2 fiducial marks directly above the negative electrode. What is the direction of the electric field at this location?

CHECKPOINT 3: Ask your TA to check your field lines and measurements before proceeding.

Procedure D: Line and triangle

Complete the table below.

Data Table 5

Location	**A**	**B**	**C**	**D**	**E**
ΔV (V)					
Displacement d (m)					
Electric Field E (N/C)					

The area inside the triangle is an equipotential surface. Indicate if the work done by the electric field in each of the following cases should be positive, negative, or zero. (*Note: The value(s) given may be different in the WebAssign question.*)
to move a charge of -1.4 C from A to D:

to move a charge of -1.4 C from A to C:

to move a charge of -1.4 C from E to B:

CHECKPOINT 4: Ask your TA to check your field lines and measurements.