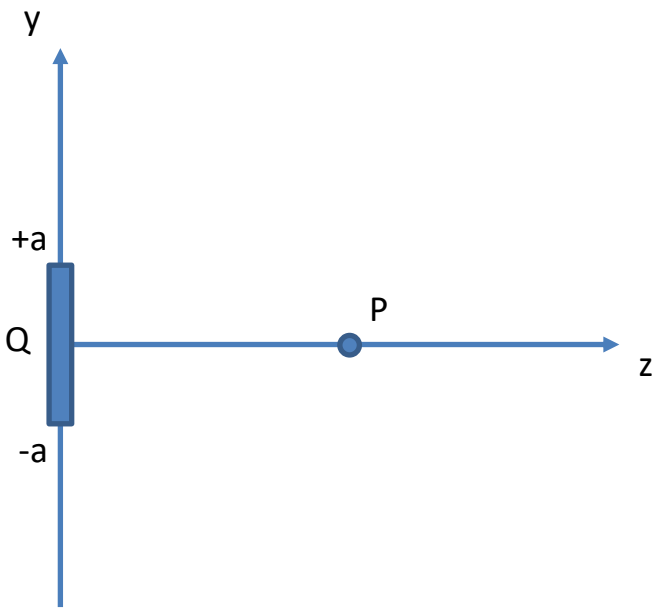
CONCEPT: POTENTIAL DIFFERENCE WITH CALCULUS

- The potential difference between two points can be defined as → $\Delta V =$ _____
  - For a constant electric field, this reduces to the familiar equation → $E =$ _____
  - For a DISTRIBUTION of charges, we will _____ V.

EXAMPLE: Calculate the potential difference due to a point charge between a point *r* away from the charge and infinity.

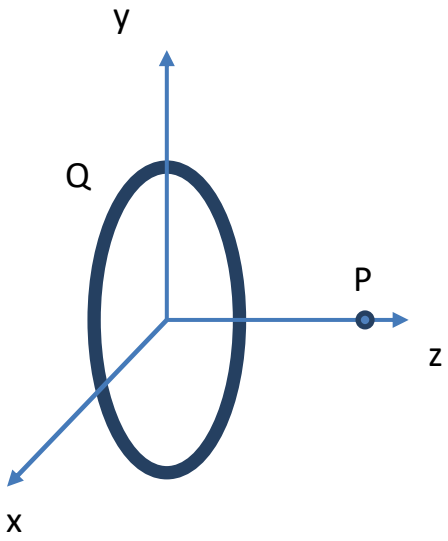
EXAMPLE: ELECTRIC POTENTIAL DUE TO LINE OF CHARGE

What is the electric potential due a line of charge, Q, with length 2a, at the point depicted in the following figure?



EXAMPLE: ELECTRIC POTENTIAL DUE TO RING OF CHARGE

What is the electric potential due to a ring of charge, Q, and radius, R, at the point indicated in the following figure?



PRACTICE: ELECTRIC POTENTIAL DUE TO DISK OF CHARGE

What is the electric potential due a disk of charge, Q, with some radius, R, at the point shown in the following figure? (hint: see "Electric Potential due to Ring of Charge")