**Activity 1-1 – August 24, 2016**

**Part 1 – Constructing the Potential**

Recall that the potential at an arbitrary point P=(x,y,z) from a point charge, q, at the origin is given by

z

y

P



x

1. Using this, write an exact expression for the potential at P=(x,y,z) from two identical point charges located at (0,0,0) and (0,y2,0).

y1 y2

P

1. Now write an exact expression for the potential at P=(x,y,z) from a string of N identical point charges along the y-axis.

y1 y2 y3 y4 y5 y6

P

1. Write an expression for the potential at point P=(x,y,z) due to an infinite line of charge on the y-axis with uniform charge density λ.

λ

P

**Part 2 – Script-r**

There is a charge +Q at point (,,).

We’re concerned with the field at point P = (x,y,z).

1. Draw on the graph: , , and (where  is Griffiths’ “script r”).

P *= (x,y,z)*

*(x’,y’,z’)*

+Q

1. Express  in terms of and .
2. Now express the Cartesian (,, and ) components of  in terms of the Cartesian components of  and . Keep your answers as simple as possible.
3. Now go back to the question on the other side (Part 1, q iii) and rewrite your integral using Griffith’s “script-r” notation. Which quantity in your equation does “script-r” represent? Which quantity takes the place of the q from part 1-i?