Physics 1320 – Spring 2025
    Due Monday February 24.

Homework 04 – Rev B

SPN 4–01 [10 pts] – Potential and Electric field of a charged sphere.
Outside of a charged sphere, you can pretend that all the charge is concentrated at a point in the center of the sphere. Imagine a sphere with one microCoulomb of charge with a radius of one meter.

[a] Sketch a sphere with radius one meter and place point "A" on the surface of the sphere and point "B" one meter from the surface of the sphere.
[b] Calculate the electric field at point "A". (Yes, it's easy.)
[c] Calculate the electric field at point "B". (Yes, it's also easy.)
[d] Calculate the electric potential difference between point "A" and point "B". (You have to do a simple integral)

SPN 4–02 [10 pts] – Potential and Electric field of a charged plate.
A square plate with 2 m sides has a total charge of 100 nC.

[a] Sketch the plate and place point "A" on the surface of the plate and point "B" ten centimeters from the surface of the plate.
[b] Calculate the electric field at point "A".
[c] Calculate the electric field at point "B".
[d] Calculate the potential difference between point "A" and point "B". (You have to do a simple integral)

SPN 4–03 [10 pts] – Potential and Electric field of a charged wire.
A wire of length 3 m and radius 1 cm has a total charge of 100 nC.

[a] Sketch the wire and place point "A" on the surface of the wire and point "B" ten centimeters from the center of the wire.
[b] Calculate the electric field at point "A".
[c] Calculate the electric field at point "B".
[d] Calculate the potential difference between point "A" and point "B".