Phy242 Computer HA

Question 1. Note that if the disk is centered at the origin, with z-axis be its central axis, then given any point P(a,b,c), the electric field at P of direction i is given by

$E_i(P) = \iint_{D(0,R)} E_i(P,Q)$

$= \iint_{D(0,R)} \frac{dq}{4\pi\epsilon_0 d^2} \frac{P_i - Q_i}{d}$

$= \frac{1}{4\pi\epsilon_0} * \iint_{D(0,R)} \frac{(P_i - Q_i)}{d^3} \sigma dA$

$= \frac{1}{4\pi\epsilon_0} \sigma \int_{-R}^{R} \int_{-\sqrt{R^2-x^2}}^{\sqrt{R^2-x^2}} \frac{(P_i - Q_i)}{d^3} dydx$, where

i is one of (x,y,z), Q is a point in the disk given by position $(x, y, 0)$,

and d $= \sqrt{(a-x)^2 + (b-y)^2 + c^2}$ is the distance between Q and P.

I have made the source code available for you to check on https://github.com/Roger-Gu/Phy242, with name Q1.py

Please inform me if this should not be public and I will remove it.

Question 2. Note that if the rectangle is centered at the origin, with z-axis be its central axis, then given any point P(a,b,c), the electric field at P of direction i is given by
$E_i(P) = \iint_{D(0,R)} E_i(P,Q)$
$= \iint_{R(a,b)} \frac{dq}{4\pi\epsilon_0 d^2} \frac{P_i - Q_i}{d}$
$= \frac{1}{4\pi\epsilon_0} * \iint_{R(a,b)} \frac{(P_i - Q_i)}{d^3} \sigma dA$
$= \frac{1}{4\pi\epsilon_0} \sigma \int_{-a/2}^{a/2} \int_{-b/2}^{b/2} \frac{(P_i - Q_i)}{d^3} dydx$, where
i is one of (x,y,z), Q is a point in the disk given by position $(x, y, 0)$,
and d $= \sqrt{(a-x)^2 + (b-y)^2 + c^2}$ is the distance between Q and P.
I have made the source code available for you to check on https://github.com/Roger-Gu/Phy242, with name Q2.py
Please inform me if this should not be public and I will remove it.