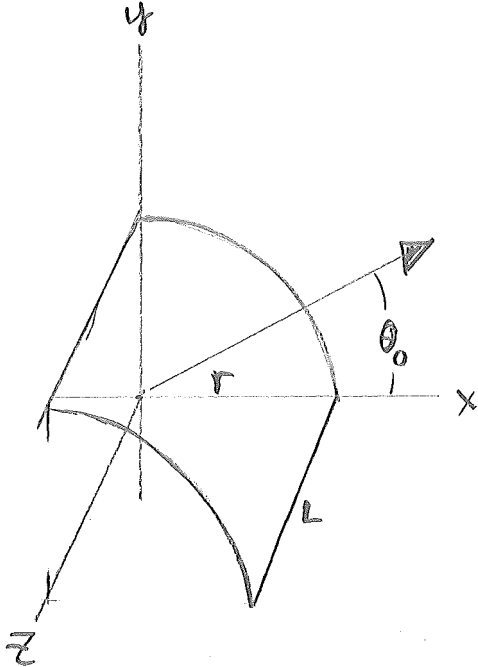
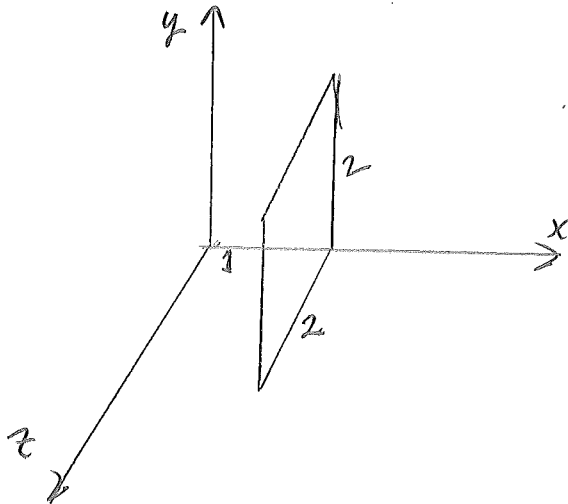


Physics 161 Fall 2010 Exam 4

1&2] What is the flux of a uniform electric field of 3320 N/C directed at an angle of 26° above the x-axis, parallel to the xy plane, through the quarter-pipe shown, with $L=10$ m and $r=2$ m (in Nm^2/C)?

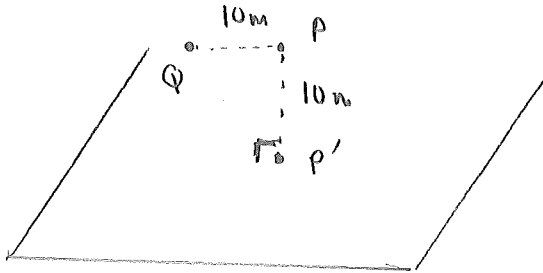


3&4] What is the flux of the electric field $E=(30z+x)\hat{i} + (40y+z)\hat{j} + 35x\hat{k}$ (in N/C) through the flat surface shown?



5&6] Consider an infinite insulating sheet of charge of charge density 0.003 C/m^2 . What is the difference in electrical potential (in Volts) between a point in the sheet, P' and a point 5 m above the sheet, P ?

7&8] Suppose now that a point charge of $Q=0.001 \text{ C}$ is placed 5 m to the left of point P . Now, what is the difference in potential of these two points?



On the real exam, the sheet might be a line of charge.

9&10] An electric field is given by $E = 40x\hat{i}$. (in N/C) What is the difference in potential between $x=0$ and $x=3$, in V?

11] An electric potential is given by $V=6000x^3$ in volts, x in meters. What is the electric field direction at $x=-3 \text{ m}$?

A] + B] - C] $E=0$.

12&13] What is the magnitude of the electric field in problem 7? (in N/C)

14&15] A charge is moved along the quarter circle path shown, from $x = 3 \text{ m}$ to $y=3 \text{ m}$. How much work (in J) does the electric field do on the charge, $Q=6 \text{ C}$?

