NAME:	Quiz #1:
Solution	Phys142

Required constants are given on the next page. Note that g, the gravational acceleration near the earth's surface, is 9.8 m/s<sup>2</sup>

An electron is suspended directly above a large flat horizontal charged sheet which counteracts the gravitational force. The geometry is sketched below:



Charged sheet

(a) [2 pts] What is the required sign of the charge on the sheet to suspend the electron? (-) for repulsive force

(b) [2 pts] Draw the electric field produced by the charged sheet (ignoring the fied produced by the electron). See above
(c) [2 pts] Draw the force diagram on the electron including gravitational and electric force. diff.

(d) [4 pts] What is the magnitude of the electric field produced by the sheet at the location of the electron?

$$F_{net} = F_{e} - mg = 0 \implies qE = mg \implies E = \frac{mg}{9}$$

$$E = \frac{(9.11 \times 10^{-31} kg)(9.8 m/s^{2})}{1.6 \times 10^{-19} c} = 5.55 \times 10^{-11} N/c \quad (-j) \text{ direction})$$