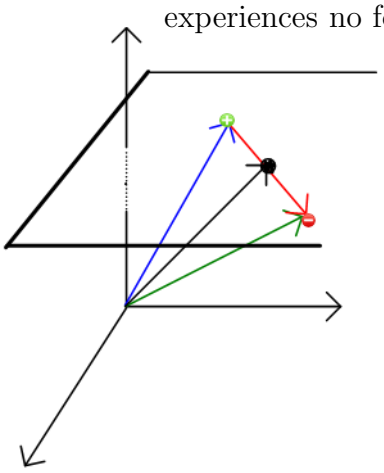
**Engineering 5812 Tutorial 2** **Winter 2012**

1. A point charge $Q_1 = 8\ \mu$C is located at $P_1(2, 5, 8)$ in free space while a point charge $Q_2 = -5\ \mu$C is located at $P_2(6, 15, 8)$. (a) Find the vector force exerted on $Q_2$ by $Q_1$. (b) Find the coordinates of point $P_3$ at which a point charge $Q_3$ experiences no force.



2. Point charges of 120 nC are located at points $A(0, 0, 1)$ and $B(0, 0, -1)$ in free space. (a) Find $\vec{E}$ at $C(0.5, 0, 0)$. (b) What single charge at the origin would result in an identical field at $C$ as that calculated in (a)?

3. A uniform line charge density $\rho_L = 20$ nC/m exists on the $z$-axis between $z = 1$ and $z = 3$. Find $\vec{E}$ at (a) the origin and (b) $P(4, 0, 0)$.