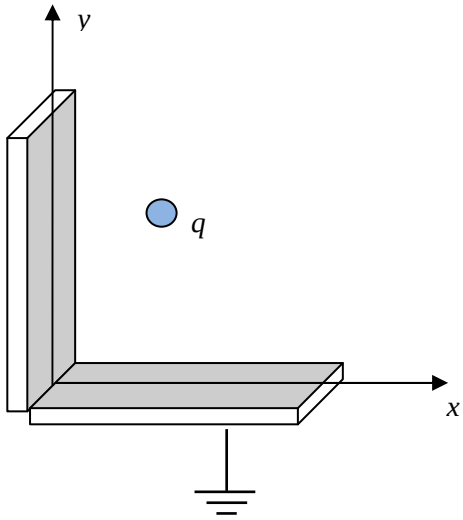
Lesson #15: Method of Images **Name:** _____

Study Section 3.2 and answer the following questions:

Let's extend the "Classic Image Problem" of section 3.2.1 to include <u>two</u> grounded, conducting planes that meet at right angles as shown. The planes are semi-infinite in the *x*-*z* and *y*-*z* planes. A point charge *q* is located at (*a*,*b*,*0*).

Your task is to find the potential $V(x, y, z)$ in the region $x > 0$, $y > 0$. You must replace the conducting planes with image charges (you will need more than one!) which produce the same boundary conditions. Try to work this out and, when you have a scenario that works, answer the following:



a. How many image charges do you need to do the job?

b. Specify the location and charge value of each image charge.

c. What is the potential created by all the point charges (including the original *q*) as a function of (x, y, z) in the region of interest?

d. Show that your answer to part c gives the correct boundary potentials for $x = 0$ and $y = 0$.

e. How would you find the charge density σ induced on one of the conducting planes?