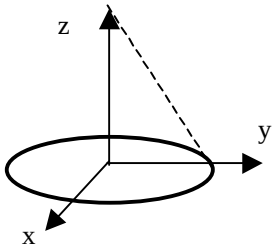
Electric field at a distance "L" from an infinite plane of surface charge density "s ".



Field from ring has magnitude $\Delta E = \frac{\Delta Q}{4pe_0 d^2} = \frac{s\,(2prdr)}{4pe_0 d^2}$

Now what about direction of field: Note that the horizontal component cancels and only the vertical component survives.

is a constant both in magnitude and direction independent of z (and x and y).