Consider two situations:

A point charge q is placed at a distance d from a large conducting uncharged plate. The magnitude of the force experienced by q is R.

A point charge q is placed at a distance d each from the two perpendicular conducting uncharged large plates meeting at right angle. The magnitude of the force experienced by q is S.
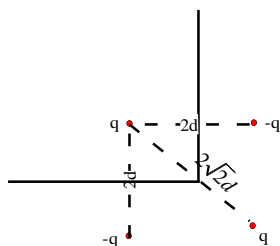
Find the value of the ratio S/R.

Solution

Using the method of mirror image for the first case,
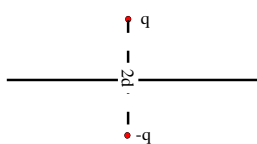
$$R = k \frac{q^2}{4d^2}$$

Using the method of mirror images for the second case,

S is the resultant of three forces, two attractive and one repulsive.

Each attractive force $= k \dfrac{q^2}{4d^2} = R$

The two attractive forces can be combined as $R\sqrt{2}$

Repulsive force $= k \dfrac{q^2}{8d^2} = R/2$

$$S = R\sqrt{2} - \frac{R}{2}$$

The ratio S/R = $\dfrac{R\sqrt{2} - \dfrac{R}{2}}{R} = \sqrt{2} - 0.5 \approx 0.91$