Force between the Plates of a Parallel Plate Capacitor.

Field due to charge on one plate on the other is $E = \frac{\sigma}{2\varepsilon_0}$, hence the force $F = QE$

$$F = -\sigma A \times \left(\frac{\sigma}{2\varepsilon_0} \right) = -\frac{\sigma^2}{2\varepsilon_0} A$$

$$\Rightarrow \qquad |F| = \frac{\sigma^2 A}{2\varepsilon_0} = \frac{Q^2}{2\varepsilon_0 A}$$