

48. When sphere  $C$  touches sphere  $A$ , they divide up their total charge ( $Q/2$  plus  $Q$ ) equally between them. Thus, sphere  $A$  now has charge  $3Q/4$ , and the magnitude of the force of attraction between  $A$  and  $B$  becomes

$$F = k \frac{\left(\frac{3Q}{4}\right) \left(\frac{Q}{4}\right)}{d^2} = 4.68 \times 10^{-19} \text{ N} .$$