

31. We combine Eq. 23-9 and Eq. 23-28 (in absolute values).

$$F = |q|E = |q| \left(\frac{p}{2\pi\epsilon_0 z^3} \right) = \frac{2ke p}{z^3}$$

where we use Eq. 22-5 in the last step. Thus, we obtain

$$F = \frac{2 (8.99 \times 10^9 \text{ N}\cdot\text{m}^2/\text{C}^2) (1.60 \times 10^{-19} \text{ C}) (3.6 \times 10^{-29} \text{ C}\cdot\text{m})}{(25 \times 10^{-9} \text{ m})^3}$$

which yields a force of magnitude $6.6 \times 10^{-15} \text{ N}$. If the dipole is oriented such that \vec{p} is in the $+z$ direction, then \vec{F} points in the $-z$ direction.