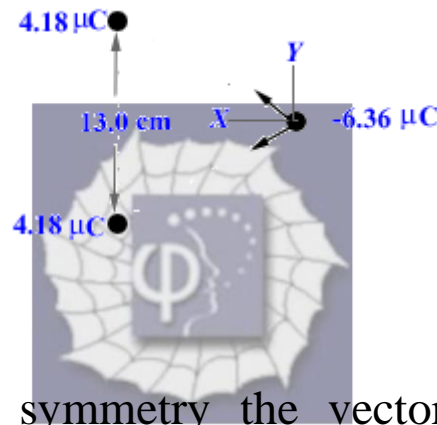


274.

**Problem 27.9 (RHK)**

*Two positive charges, each  $4.18 \mu\text{C}$ , and a negative charge,  $-6.36 \mu\text{C}$ , are fixed at the vertices of an equilateral triangle of side  $13.0 \text{ cm}$ . We have to find the electrical force on the negative charge.*



**Solution:**

Because of the symmetry the vector sum of the y-components of the forces on the charge,  $-6.36 \mu\text{C}$ , due to charges  $4.18 \mu\text{C}$  will cancel and the net force on it will be the sum of the x-components. The force on the negative charge, therefore, will be along the x-axis and its magnitude will be

$$F = \frac{2}{4\pi\epsilon_0} \left( \frac{4.18 \times 6.36 \times 10^{-12}}{(13.0 \times 10^{-2})^2} \right) \times \cos 30^\circ \text{ N} .$$

Or

$$F = 2 \times 8.99 \times 10^9 \times \left( \frac{4.18 \times 6.36 \times 10^{-12}}{(13.0 \times 10^{-2})^2} \right) \times \frac{\sqrt{3}}{2} \text{ N}$$
$$= 24.49 \text{ N.}$$

