42. (a) Charge $Q_1 = +80 \times 10^{-9}$ C is on the y axis at $y = 0.003$ m, and charge $Q_2 = +80 \times 10^{-9}$ C is on the y axis at $y = -0.003$ m. The force on particle 3 (which has a charge of $q = +18 \times 10^{-9}$ C) is due to the vector sum of the repulsive forces from Q_1 and Q_2. In symbols, $\vec{F}_{3\,1} + \vec{F}_{3\,2} = \vec{F}_{3\ \mathrm{net}}$, where

$$|\vec{F}_{3\,1}| = k\,\frac{q_3\,|q_1|}{r_{3\,1}^2} \qquad \text{and} \quad |\vec{F}_{3\,2}| = k\,\frac{q_3\,q_2}{r_{3\,2}^2} \quad .$$

Using the Pythagorean theorem, we have $r_{3\,1} = r_{3\,2} = 0.005$ m. In magnitude-angle notation (particularly convenient if one uses a vector capable calculator in polar mode), the indicated vector addition becomes

$$(0.518 \angle -37^\circ) + (0.518 \angle 37^\circ) = (0.829 \angle 0^\circ) \quad .$$

Therefore, the net force is 0.829 N in the $+x$ direction.

(b) Switching the sign of Q_2 amounts to reversing the direction of its force on q. Consequently, we have

$$(0.518 \angle -37^\circ) + (0.518 \angle -143^\circ) = (0.621 \angle -90^\circ) \quad .$$

Therefore, the net force is 0.621 N in the $-y$ direction.