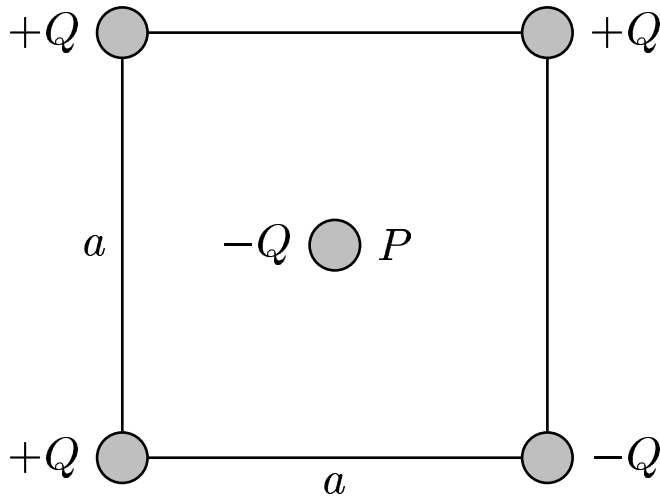


Four point charges are located a distance  $a$  apart at the corners of a square.

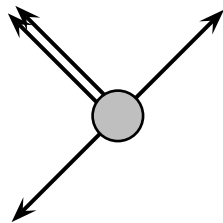


Determine the magnitude of the electric force on a negative charge  $-Q$  located at the center of the square.

- A)  $\|\vec{F}\| = 4 \frac{Q^2}{a^2}$ .                      C)  $\|\vec{F}\| = \sqrt{2} \frac{Q^2}{a^2}$ .
- B)  $\|\vec{F}\| = 2 \frac{Q^2}{a^2}$ .                      D)  $\|\vec{F}\| = \frac{Q^2}{a^2}$ .

Coulomb's law is  $\vec{F}_{AB} = k \frac{Q_A Q_B}{r^2} \hat{r}_{AB}$ , which tells us that unlike charges attract and like charges repel.

$$\|\vec{F}\| = 2 \frac{Q^2}{\left(\frac{a}{\sqrt{2}}\right)^2} = 4 \frac{Q^2}{a^2}.$$



Answer **A**.