

Section

# 17-3

HOLT PHYSICS

# Concept Review

## *The Electric Field*

Use  $k_C = 8.99 \times 10^9 \text{ N}\cdot\text{m}^2/\text{C}^2$ .

1. Four positive charges,  $q_1$ ,  $q_2$ ,  $q_3$ , and  $q_4$ , of  $8.00 \mu\text{C}$ , each are arranged to form a  $30.0 \text{ cm}$  wide square as shown.

a. Find the distance of each charge from the center of the square.

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b. Find the strength and direction of the electric field vectors of  $q_1$ ,  $q_2$ ,  $q_3$ , and  $q_4$  at the center of the square.

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c. Find the strength and direction of the electric field at the center of the square.

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2. In a Millikan experiment, a droplet of mass  $4.7 \times 10^{-15} \text{ kg}$  floats in an electric field of  $3.20 \times 10^4 \text{ N/C}$ .

a. What is the force of gravity on this droplet?

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b. What is the electric force that balances it?

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c. What is the excess charge?

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d. How many excess electrons are there on this droplet?

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