

Mean 19.6  
 No. of students = 259  
 FIRST MIDTERM sdev. = 5.2

3

Name (print) \_\_\_\_\_ Name (signed) \_\_\_\_\_

Discussion Instructor (circle one): Davis DeTienne Hamed Molina Paul Zhang

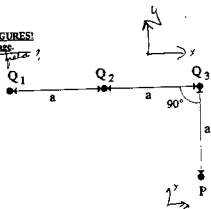
Discussion Section # \_\_\_\_\_

**SHOW ALL WORK!!!**  
**REPORT ALL NUMBERS TO THREE SIGNIFICANT FIGURES!**  
 Use the conversion constants and data given on the front page.

Calculate the electric field, magnitude and direction at point P. The direction should be given as an angle measured from the positive x-axis. (Be sure to include the proper sign for the angle.)

$Q_1 = +125 \mu\text{C}$   
 $Q_2 = -300 \mu\text{C}$   
 $Q_3 = +175 \mu\text{C}$   
 $a = 4.25 \text{ mm}$

not specified on diag.  
 electric field?



$$E_x = E_{1x} + E_{2x} + E_{3x}$$

$$= k \frac{Q_1}{5a^2} \left( +\frac{2a}{\sqrt{5}a} \right) + \frac{kQ_2}{2a^2} \left( +\frac{1}{\sqrt{2}} \right) = 1.11 \times 10^{10} \text{ N/C} - 5.28 \times 10^{10} \text{ N/C}$$

$$= -4.17 \times 10^{10} \text{ N/C}$$

$$E_y = -\frac{k}{a^2} \left( \frac{Q_1}{5a} \frac{1}{\sqrt{5}} + \frac{Q_2}{2} \left( \frac{1}{\sqrt{2}} \right) + Q_3 \right) = -0.557 \times 10^{10} \text{ N/C} + 5.28 \times 10^{10} \text{ N/C} - 8.72 \times 10^{10} \text{ N/C}$$

$$= -3.99 \times 10^{10} \text{ N/C}$$

$$|\vec{E}| = 5.77 \times 10^{10} \text{ N/C}$$

$$\text{dir} = -136^\circ \text{ from +ve x axis.}$$