

Examen Corto 1.

a) $Q = -1.75 \mu C$
 $m = 5.00 g = 5 \times 10^{-3} kg$
 $Q = 324 m/s^2$

$$\Sigma \vec{F} = m\vec{a}$$

$$\vec{F} = (5 \times 10^{-3})(324)$$

$$F = 1.62 N (y)$$

$$F_y = F_{1y} + F_{2y}$$

$$1.62 = \frac{k q_1 Q \sin \theta}{0.03^2} + \frac{k q_2 Q \sin \theta}{0.03^2}$$

$$1.62 = 2 \left(\frac{k |q| |Q| \sin \theta}{0.03^2} \right) = \frac{2 (9 \times 10^9) (|q|) (1.75 \mu) (0.0225 / 0.03)}{0.03^2}$$

$$\frac{0.03^2 (1.62)}{2 (9 \times 10^9) (1.75 \mu) (0.0225 / 0.03)} = |q|$$

$$|q| = 6.17 \times 10^{-8} C$$

\Rightarrow

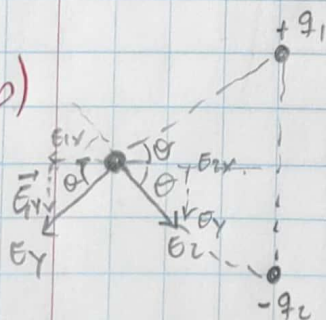
$$q_1 = 61.7 nC$$

$$q_2 = -61.7 nC$$

$$q_1 = 6.17 \times 10^{-8} C$$

$$q_2 = -6.17 \times 10^{-8} C$$

b)



$$E = \frac{k q}{r^2}$$

$$E_{1x} = \frac{k q \cos \theta}{0.03^2}$$

$$E_{1x} = \frac{k (6.17 \times 10^{-8}) \cos 229^\circ}{0.03^2} = -404,788.42 N/C$$

$$E_{1y} = \frac{k (6.17 \times 10^{-8}) \sin 229^\circ}{0.03^2} = -465,655.81 N/C$$

$$E_{2x} = \frac{k (6.17 \times 10^{-8}) \cos 49^\circ}{0.03^2} = 404,788.42 N/C$$

$$E_{2y} = \frac{k (6.17 \times 10^{-8}) \sin 49^\circ}{0.03^2} = -465,655.81 N/C$$



$$\theta = \sin^{-1} \left(\frac{0.0225}{0.03} \right)$$

$$\theta = 48.59^\circ \approx 49^\circ$$

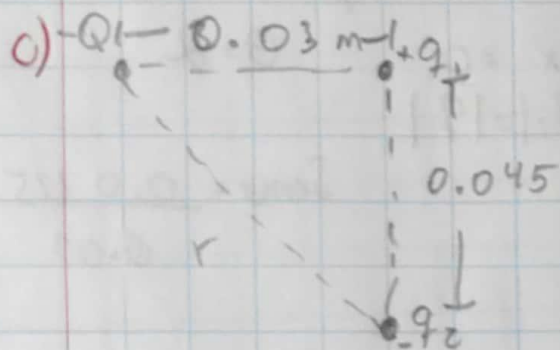
$$\theta = 180 + 49 = 229^\circ$$

$$E_x = 0 \text{ N/C} - 931,331.62 \text{ N/C}$$

$$|E| = \sqrt{0^2 + (-931,331.62)^2} = 931,331.62 \text{ N/C}$$

$$E = 931 \times 10^3 \text{ N/C}$$

$$E = 931.33 \text{ MN/C}$$



$$r^2 = 0.03^2 + 0.045^2 \text{ m}$$

$$r^2 = 2.925 \times 10^{-3} \text{ m}$$