

Coulombs Law Application #7
 A charge of +20 micro coulombs and +30 micro coulombs are placed 80 cm apart and have a force of 822 N on them in an unknown substance.
 If a third charge of +10 micro C is brought in 6.0 cm below Q1. Find the NET force on Q1.

$$F = \frac{k Q_1 Q_2}{d^2} \quad k = \frac{F d^2}{Q_1 Q_2}$$

$$= \frac{(822 \text{ N}) (0.8 \text{ m})^2}{(+20 \times 10^{-6} \text{ C}) (+30 \times 10^{-6} \text{ C})}$$

$$= \frac{8.77 \times 10^9 \text{ N m}^2}{\text{C}^2}$$

$$F_{Q_1 Q_2} = 822 \text{ N}$$

$$F_{Q_1 Q_3} = \frac{(8.77 \times 10^9) (+20 \times 10^{-6}) (+10 \times 10^{-6})}{(0.06 \text{ m})^2}$$

$$= 487 \text{ N}$$

$$\tan \theta = \frac{822}{487} \quad \theta = 59.4^\circ$$

$$F_{\text{net}}^2 = (822)^2 + (487)^2 \quad F_{\text{net}} = 956 \text{ N} \quad 360 - 59.4 = 300.6^\circ$$

$$F_{\text{net}} = 956 \text{ N}$$

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