Quiz 1

Friday, September 17

The following information may or may not be of use:

$$\varepsilon_0 = 8.85 \times 10^{-12} \text{C}^2 \text{ N}^{-1} \text{ m}^{-2}$$
$$k = \frac{1}{4\pi\varepsilon_0} = 9 \times 10^9 \text{N m}^2 \text{ C}^{-2}$$
$$|\vec{E}_{dipole,on-axis}| \approx \frac{1}{4\pi\varepsilon_0}\frac{2p}{r^3}$$
$$|\vec{E}_{dipole,perp}| \approx \frac{1}{4\pi\varepsilon_0}\frac{p}{r^3}$$

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1. In a certain coordinate system, a point charge $q_1 = -4$ μC is located at the position $\vec{r}_1 =< 4, -1, 0 >$ m. A second charge $q_2 = 6$ μC sits at $\vec{r}_2 =< 0, 5, 0 >$ m. Finally, a third charge $q_3 = 9$ μC is at $\vec{r}_3 =< -3, -7, 0 >$ m. What is the net force exerted on q_3 due to q_1 and q_2? Be sure to express your answer as a vector with correct units.