1. Two equal charges, each +4.0 μC are located on the x-axis at the origin and at x = 6.0 m as shown. A third +1.0 μC charge is placed at the point (6.0m, 6.0m). Find the resulting force on the +1.0 μC charge. You can either report the magnitude and direction of the force or the Cartesian coordinates of the force.

Specifically:
- Draw the forces on the 1.0 μC charge (3 points)
- Find the magnitude of these forces (4 points)
- Properly combine the vectors to get the total force. (3 points)

\[
\begin{align*}
F_1 &= \frac{k q_1 q_2}{r_1^2} = \left(\frac{9 \times 10^9 \text{ N} \cdot \text{m}^2}{\text{C}^2}\right)\left(4 \times 10^{-6} \text{ C}\right)\left(1 \times 10^{-6} \text{ C}\right) \frac{1}{72 \text{ m}^2} \\
&= 0.0005 \text{ N} \\
F_{1x} &= (0.0005 \text{ N}) \cos 45^\circ \\
&= 0.000354 \text{ N} \\
F_{2x} &= 0.000354 \text{ N} \\
\end{align*}
\]

\[
\begin{align*}
\vec{F} &= F_1 + F_2 \\
&= 0.000354 \text{ N} \hat{i} + (0.001 \text{ N} + 0.000354 \text{ N}) \hat{j} \\
&= 0.000354 \text{ N} \hat{i} + 0.00135 \text{ N} \hat{j} \\
|\vec{F}| &= \sqrt{(0.000354 \text{ N})^2 + (0.00135 \text{ N})^2} = 0.00139 \text{ N} \\
\Theta &= \tan^{-1} \left(\frac{F_{2y}}{F_{2x}}\right) = \tan^{-1} \left(\frac{0.00135 \text{ N}}{0.000354 \text{ N}}\right) = 75.4^\circ
\end{align*}
\]

Possibly useful information:
- \( k = 9.0 \times 10^9 \text{ N} \cdot \text{m}^2/\text{C}^2 \)
- \( \varepsilon_0 = 8.85 \times 10^{-12} \text{ C}^2/\text{N} \cdot \text{m}^2 \)
- \( e = 1.9 \times 10^{-19} \text{ C} \)
- \( \vec{F} = \frac{k q_1 q_2}{r^2} \hat{r} \)

E.C. Who quarterbacked the AFL Buffalo Bills in the 1960’s prior to entering a career in politics? (1 point)

\[\text{JACK KEMP}\]