The following are short answer for which partial credit may possibly be awarded. Therefore, it is to your advantage to show all your work. Each problem is labeled with how many points it is worth.

1. (3pts) Three particles of charge $-q$, $+q$, and $+2q$ are fixed at the corners of an equilateral triangle of side length s as shown below. What is the net force on the $+2q$ charge (**box** your answer and keep in mind that the force is expressed as a vector)?

2. (3pts) Shown below is an infinite (well, very large anyway!) line of charge with charge density $3.0\mu C/m$. This line of charge lies along the center of a hollow, conducting, cylindrical shell with inner radius $11cm$ and outer radius $22cm$. The outer shell has no net charge.

   (a) What's the magnitude of the electric field $2.0cm$ from the line of charge?

   (b) What's the magnitude of the electric field $50.0cm$ from the line of charge?

   (c) Sketch the value of the electric field $E(r)$ as a function of the distance from the center of the cylinder, r.

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3. (3pts) A thin nonconducting rod of charge has a peculiar charge density. Instead of being uniform, the charge density increases as you go rightward and can be expressed in units of C/m as $\lambda = x^2 \left(1.0C/m^3\right)$ if x is given in meters and $x = 0$ at the left end of the rod as shown. If the rod is $1.0m$ long, what is the electric field at point P along the x-axis a distance of $0.60m$ rightward from the right end?