# Web**Assign**
CH16-HW01-FALL2010 (Homework)

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PHYS 272-FALL 2012, Fall 2012
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Current Score : 22.5 / 22.5   **Due :** Tuesday, September 11 2012 11:58 PM EDT

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1. 8.5/8.5 points | [Previous Answers](#)   MI3 16.2.X.019

A plastic rod 1.4 m long is rubbed all over with wool, and acquires a charge of -7e-08 coulombs. We choose the center of the rod to be the origin of our coordinate system, with the *x*-axis extending to the right, the *y*-axis extending up, and the *z*-axis out of the page. In order to calculate the electric field at location *A* = < 0.7, 0, 0 > m, we divide the rod into 8 pieces, and approximate each piece as a point charge located at the center of the piece.
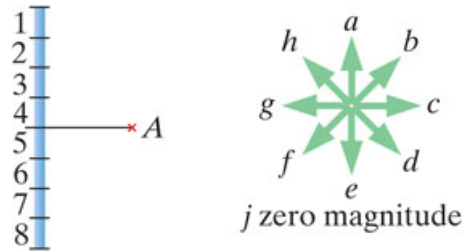
(a) What is the length of one of these pieces?

0.175 ✔ m

(b) What is the location of the center of piece number 2?

< 0 ✔ , 0.4375 ✔ , 0 ✔ > m.

(c) How much charge is on piece number 2? (Remember that the charge is negative.)

–8.75e–9 ✔ coulombs

(d) Approximating piece 2 as a point charge, what is the electric field at location *A* due only to piece 2?

$\vec{E}_2$ = < -98 ✔ , 61.252 ✔ , 0 ✔ > N/C

(e) To get the net electric field at location *A*, we would need to calculate $\vec{E}$ due each of the 8 pieces, and add up these contributions. If we did that, which arrow above would best represent the direction of the net electric field at location *A*?

g ⬍ ✔

- *Read the eBook*
- [Section 16.2](#)

2. 4/4 points | Previous Answers   MI3 16.2.X.020

A thin plastic rod of length 2.3 m is rubbed all over with wool, and acquires a charge of 98 nC, distributed uniformly over its surface. Calculate the magnitude of the electric field due to the rod at a location 9 cm from the midpoint of the rod. Do the calculation two ways, first using the exact formula for a rod of any length, and second using the approximate formula for a long rod.
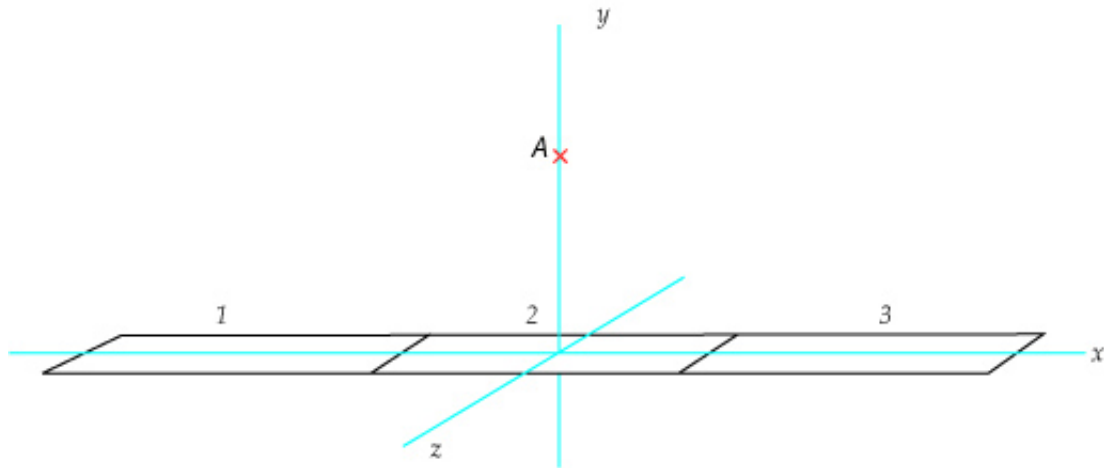
> (a) exact formula
> $E = $ [8495.7616] ✔   N/C
> (b) approximate formula
> $E = $ [8521.74] ✔   N/C

- *Read the eBook*
- Section 16.2

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3. 10/10 points | Previous Answers   MI3 16.C.P.069.alt02

A strip of invisible tape 0.14 m long by 0.019 m wide is charged uniformly with a total net charge of 4 nC (nano = 1e-9) and is suspended horizontally, so it lies along the x axis, with its center at the origin, as shown in the diagram.

> Calculate the approximate electric field at location < 0, 0.03, 0 > m (location A) due to the strip of tape. Do this by dividing the strip into three equal sections, as shown in the diagram, and approximating each section as a point charge.
> What is the approximate electric field at A due to piece #1?
> $\vec{E}_1 \approx$

Flash Player version 10 or higher is required for this question.
You can get Flash Player free from Adobe's website.

✔   N/C

What is the approximate electric field at *A* due to piece #2?

$\vec{E}_2 \approx$

Flash Player version 10 or higher is required for this question.
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✔ N/C

What is the approximate electric field at *A* due to piece #3?

$\vec{E}_3 \approx$

Flash Player version 10 or higher is required for this question.
You can get Flash Player free from Adobe's website.

✔ N/C

What is the approximate net electric field at *A*?

$\vec{E}_{net} \approx$

Flash Player version 10 or higher is required for this question.
You can get Flash Player free from Adobe's website.

✔ N/C

What could you do to improve the accuracy of your calculation?

☑ Divide the tape into more pieces.

☐ Divide the tape into fewer pieces.

☐ Use three pieces but give many more significant figures in the answer.

✔

- *Read the eBook*
- Section 16.1