$$\Delta x = 1 \cdot \Delta\varphi = 0 =$$

$$= \Delta\delta_i = 2\left[\ell\sqrt{2}\left(\frac{1}{\ell\sqrt{2}}\right)\left(-q\ell\sqrt{2} + \frac{X}{\ell\sqrt{2}}\right)\frac{1}{\cancel{E}A} + \right.$$

$$\left. + \ell\sqrt{2}\left(-\frac{1}{\ell\sqrt{2}}\right)\left(-q\ell\sqrt{2} - \frac{X}{\ell\sqrt{2}}\right)\frac{1}{\cancel{E}A}\right] +$$

$$\left. + \frac{1}{\cancel{E}I}\int_0^{2\ell}\left(-\frac{1}{2\ell}z\right)\left(q\ell z - \frac{q z^2}{2} - \frac{X}{2\ell}z\right)dz \right] =$$

$$= 2\left(-\cancel{q\ell\sqrt{2}} + \frac{X}{\ell\sqrt{2}} + \cancel{q\ell\sqrt{2}} + \frac{X}{\ell\sqrt{2}}\right)\cdot\frac{1}{A} +$$

$$+ \frac{1}{I}\int_0^{2\ell}\left(-\frac{q z^2}{2} + \frac{q z^3}{4\ell} + \frac{X z^2}{4\ell^2}\right)dz =$$

$$= \frac{X\, 2\sqrt{2}}{\ell A} + \frac{1}{I}\left(-\frac{q\, 8\ell^3}{6} + \frac{q\, 16}{16\ell}\ell^4 + \frac{X\, 8\ell^3}{12\,\ell^2}\right) =$$

$$= \frac{X\, 2\sqrt{2}}{\ell A} + \frac{X\, 2\ell}{3I} - \frac{q\ell^3}{3I} = X\left(\frac{2\sqrt{2}}{\ell A} + \frac{2}{3I}\ell\right) - \frac{q\ell^3}{3I}$$

$$\underline{X = \frac{q\ell^3}{3I} \Big/ \left(\frac{2\sqrt{2}}{\ell A} + \frac{2\ell}{3I}\right)}$$