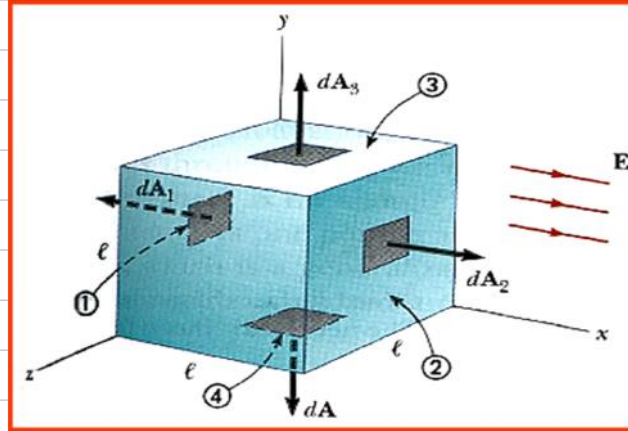
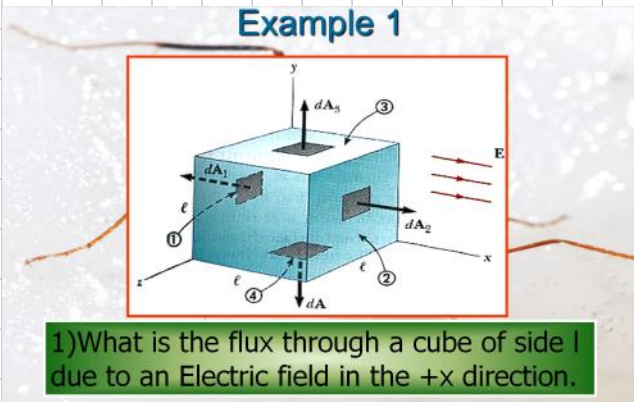


Example 1



③ $\vec{A} \rightarrow \vec{E} \quad \theta = 90^\circ$

$$\Phi_{3456} = E A \cos(90^\circ) = 0$$

① $\theta = 180^\circ$

$$\vec{A} \leftarrow \vec{E}$$

$$\Phi_1 = E A \cos(180^\circ)$$

$$\Phi_1 = -E A$$

② $\theta = 0^\circ$

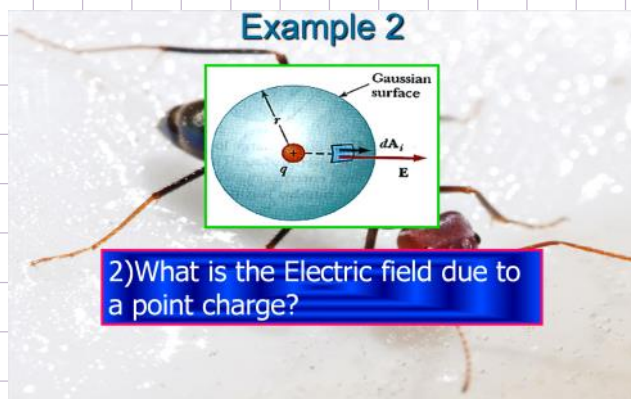
$$\vec{A} \rightarrow \vec{E}$$

$$\Phi_2 = E A \cos(0^\circ)$$

$$\Phi_2 = E A$$

$$\Phi_{total} = \Phi_1 + \Phi_2 + \Phi_{3456} = 0$$

Example 2



$\theta = 0$

$$\Phi = \frac{q_{enc}}{\epsilon_0}$$

$$E A_s \cos \theta = \frac{q_{enc}}{\epsilon_0}$$

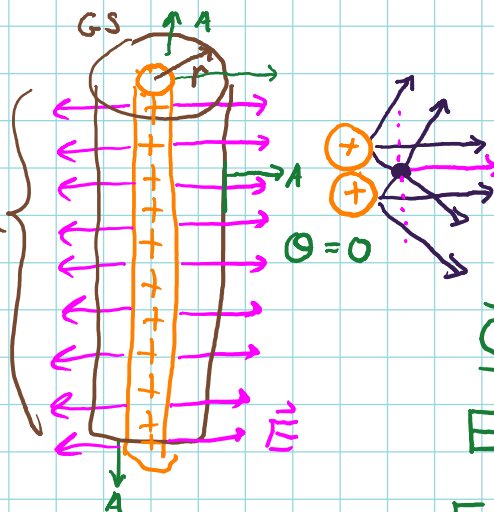
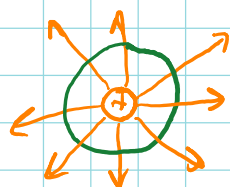
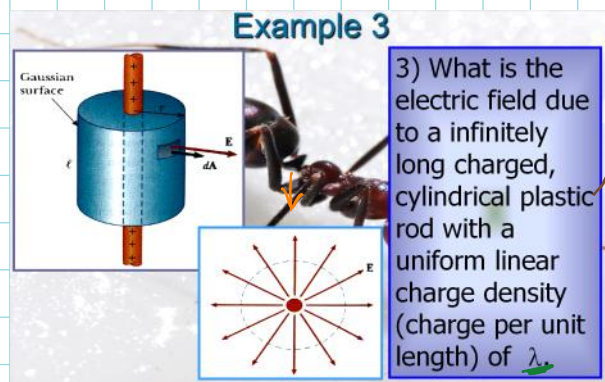
$$E (4\pi r^2) = \frac{q}{\epsilon_0}$$

$$E = \frac{q}{4\pi r^2 \epsilon_0}$$

$$E = \frac{1}{4\pi \epsilon_0} \frac{q}{r^2}$$

$$E = k \frac{q}{r^2}$$

Example 3



$$\Phi = \frac{q_{enc}}{\epsilon_0}$$

$$E A_s \cos \theta = \frac{q_{enc}}{\epsilon_0}$$

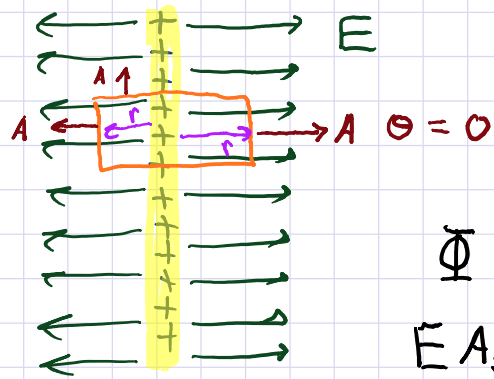
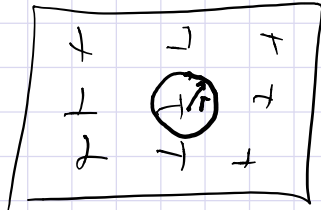
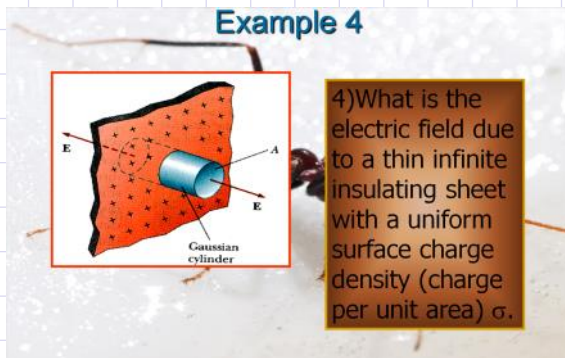
$$E (\lambda 2\pi r) = \frac{\lambda L}{\epsilon_0}$$

$$E = \frac{1}{2\pi\epsilon_0} \frac{\lambda}{r}$$

$$E = \frac{2}{4\pi\epsilon_0} \frac{\lambda}{r}$$

$$E = k \frac{2\lambda}{r}$$

Example 4



$$\Phi = \frac{q_{enc}}{\epsilon_0}$$

$$E A_s \cos \theta = \frac{q_{enc}}{\epsilon_0}$$

$$E (2\pi r^2) = \frac{\sigma (\pi r^2)}{\epsilon_0}$$

$$E = \frac{\sigma}{2\epsilon_0}$$

