Calculating $\vec{E}$ from Gauss's Law: Charged Plane Sheet

- Consider a uniformly charged plane sheet.
- Charge per unit area on sheet: σ (here assumed positive).
- Use Gaussian cylinder with cross-sectional area A placed as shown.
- Electric flux through Gaussian surface: $\Phi_E = \oint \vec{E} \cdot d\vec{A} = 2EA$.

  Net charge charge inside Gaussian surface: $Q_{in} = \sigma A$.
- Gauss's law $\oint \vec{E} \cdot d\vec{A} = \dfrac{Q_{in}}{\epsilon_0}$ becomes $2EA = \dfrac{\sigma A}{\epsilon_0}$.
- Electric field at both ends of cylinder: $E = \dfrac{\sigma}{2\epsilon_0}$

  (pointing away from sheet).
- Note that E does not depend on the distance from the sheet.