Some Basic Results

These are some things that (i) you need to know how to derive (from Gauss's Law or Ampere's Law), and (ii) that you ought to have memorized, so you can simply quote the result if needed for a problem.

- Point charge: $\mathbf{E} = \dfrac{q}{4\pi\epsilon_0 r^2}\,\hat{\mathbf{r}}$

- Uniform line charge: $\mathbf{E} = \dfrac{\lambda}{2\pi\epsilon_0 s}\,\hat{\mathbf{s}}$

- Uniform plane charge: $\mathbf{E} = \dfrac{\sigma}{2\epsilon_0}\,\hat{\mathbf{n}}$ where $\hat{\mathbf{n}}$ points away from plane on either side.

- Opposite charged parallel plates: $\mathbf{E} = \dfrac{\sigma}{\epsilon_0}\,\hat{\mathbf{n}}$ where $\hat{\mathbf{n}}$ points from $+\sigma$ to $-\sigma$.

- Line current: $\mathbf{B} = \dfrac{\mu_0 I}{2\pi s}\,\hat{\phi}$

- Plane current: $\mathbf{B} = \dfrac{\mu_0}{2}\mathbf{K} \times \hat{\mathbf{n}}$ where $\hat{\mathbf{n}}$ points away from plane on either side.

- Solenoid: $\mathbf{B} = \mu_0 n I\,\hat{\mathbf{z}}$ inside, $\mathbf{B} = 0$ outside. n turns per unit length.