[lex85] Electric and magnetic fields of spherical wave

Start from the results of [lex84], namely the scalar potential $\Phi(\mathbf{x}, t)$ and the vector potential $\mathbf{A}(\mathbf{x}, t)$ for a spherical wave, to calculate the electric and magnetic fields of that wave.

(a) Derive the magnetic field $\mathbf{B}$ from the vector potential via $\mathbf{B} = \nabla \times \mathbf{A}$.

(b) Infer the electric field $\mathbf{E}$ from the scalar and vector potentials via $\mathbf{E} = -\nabla\Phi - \partial\mathbf{A}/\partial t$.

(c) Derive the electric field $\mathbf{E}$ from the magnetic field $\mathbf{B}$ via Ampère's law, $\nabla \times \mathbf{B} = \mu_0\epsilon_0 \partial\mathbf{E}/\partial t$.

Solution: