11/9/13
R.A. Woodard

Solution to Problem 12.56

$$*F^{\mu\nu} \equiv \partial^\mu A^\nu - \partial^\nu A^\mu \rightarrow F_{\mu\nu} = \partial_\mu A_\nu - \partial_\nu A_\mu$$

$$*G^{\mu\nu} \equiv \epsilon^{\mu\nu\rho\sigma} F_{\rho\sigma} = 2\epsilon^{\mu\nu\rho\sigma}\partial_\rho A_\sigma$$

$$*\partial_\nu G^{\mu\nu} = 2\epsilon^{\mu\nu\rho\sigma}\partial_\nu\partial_\rho A_\sigma = 0 \quad \text{QED}$$

$\epsilon^{\mu\nu\rho\sigma}$: antisymmetric under $\nu \leftrightarrow \rho$

$\partial_\nu\partial_\rho$: symmetric under $\nu \leftrightarrow \rho$