Homework problems #5

1. Explain the source, i.e. find out in the derivation presented in the lecture, what is the reason for the gauge invariance for the kinetic term of the massless graviton.
2. Construct the inverse of the kinetic operator for the massless graviton

$$K_{\mu\nu;\lambda\sigma} = \frac{1}{2}\left[\eta_{\mu\lambda}\eta_{\nu\sigma} + \eta_{\mu\sigma}\eta_{\nu\lambda} - \eta_{\mu\nu}\eta_{\lambda\sigma}\right](-\Box)$$

3. Construct the inverse of the kinetic operator for the massive graviton

$$K_{\mu\nu;\alpha\beta} = (\eta_{\mu\alpha}\eta_{\nu\beta} - \eta_{\mu\nu}\eta_{\alpha\beta})(-\Box) - \eta_{\mu\nu}\partial_\alpha\partial_\beta - \eta_{\alpha\beta}\partial_\mu\partial_\nu + \eta_{\mu\alpha}\partial_\nu\partial_\beta + \eta_{\nu\beta}\partial_\mu\partial_\alpha - m^2(\eta_{\mu\alpha}\eta_{\nu\beta} - \eta_{\mu\nu}\eta_{\alpha\beta})$$