

## • Exercises: Lecture 4 •

Check the following formulas given during the lecture:

$$\begin{aligned} 1) \text{ In 2d: } \quad \text{Tr}[\gamma^\mu \gamma^\nu] &= 2\eta^{\mu\nu} \\ \text{Tr}[\gamma^\mu \gamma^\nu \gamma^\rho \gamma^\sigma] &= 2[\eta^{\mu\nu} \eta^{\rho\sigma} + \dots] \\ \int p_\mu p_\nu f(p^2) &= \frac{1}{2} \eta_{\mu\nu} \int p^2 f(p^2) \\ &\downarrow \\ &\text{For a Lorentz invariant regulator} \end{aligned}$$

- 2) Check that  $\Pi_{\mu\nu}^{\text{UV}}$  (in), after combining the denominators, performing the shift and the replacement of  $p \rightarrow \eta p/2$  can be written as an cross, as an  $\int d^2 p \int d^2 \alpha$
- 3) Perform the integrals and check our final formula for the anomaly