Ingredients for anomalies

Exercise 1: Let $\bar{\psi}_a$, ψ_a, $a = 1, ..., N$, be Grassmann variables, and $\bar{\psi}'_a \equiv \bar{\psi}_a + \bar{\psi}_b \bar{M}_{ba}$, $\psi'_a \equiv \psi_a + M_{ab}\psi_b$, where a summation over b is implied. Verify the validity of these relations to first order in M and $\bar{M}$:

$$\text{(a)} \quad \left\{ \prod_a \mathrm{d}\bar{\psi}'_a \right\} = \left\{ \prod_a \mathrm{d}\bar{\psi}_a \right\} \{1 - \mathrm{tr}\,[\bar{M}]\} \,,$$

$$\text{(b)} \quad \left\{ \prod_a \mathrm{d}\psi'_a \right\} = \left\{ \prod_a \mathrm{d}\psi_a \right\} \{1 - \mathrm{tr}\,[M]\} \,.$$

Exercise 2: Show that for $\theta = n\pi$, $n \in \mathbb{Z}$, $\exp(i\theta\gamma_5) = (-1)^n$.