

Homework 12
MATH 25500 Section 01
No need to hand-in

1. Define a **subspace** W of a \mathbb{R} -vector space V .
2. Let W be a subspace of a \mathbb{R} -vector space V . Define a **quotient space** V/W .
3. What is the **kernel** of a linear map T from a \mathbb{R} -vector space V to W ?
4. Let (V_i, d_i) be a sequence of \mathbb{R} -vector spaces and linear maps

$$\cdots \rightarrow V_{i-1} \xrightarrow{d_{i-1}} V_i \xrightarrow{d_i} V_{i+1} \xrightarrow{d_{i+1}} \cdots .$$

Show that $d_{i+1} \circ d_i = 0$ if and only if $\text{Im}(d_i) \subseteq \ker(d_{i+1})$.

Problems from Manfredo P. do Carmo, *Differential forms and applications*, Springer-Verlag Berlin.

#1, #4, #5, #6, #10, #11, #12, #13, #14, #15 (p.10–14)

Summer Project. Form a study group with your classmates and finish reading do Carmo's book during the summer recess.