

1. Define  $\mathbb{RP}^n = (\mathbb{R}^{n+1} \setminus 0) / \sim$  where  $(x_0, x_1, \dots, x_n) \sim (y_0, y_1, \dots, y_n)$  if and only if there is an  $\alpha \in \mathbb{R}$  such that  $(x_0, x_1, \dots, x_n) = \alpha(y_0, y_1, \dots, y_n)$ . Show that it is a CW-complex for each  $n$  and compute its homology.
2. Define  $\mathbb{CP}^n = (\mathbb{C}^{n+1} \setminus 0) / \sim$  where  $(x_0, x_1, \dots, x_n) \sim (y_0, y_1, \dots, y_n)$  if and only if there is an  $\alpha \in \mathbb{C}$  such that  $(x_0, x_1, \dots, x_n) = \alpha(y_0, y_1, \dots, y_n)$ . Show that it is a CW-complex for each  $n$  and compute its homology.