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## Riesz' Lemma

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Let  $E$  be a normed space,  $S \subset E$  a closed proper vector subspace, and  $0 < \alpha < 1$ . Then there is  $x_\alpha \in E \setminus S$  such that  $\|x_\alpha\| = 1$  and  $\|s - x_\alpha\| > \alpha$  for every  $s \in S$ .