An element x of a Banach algebra such $r(x) <\| x \|$.

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Consider $x = \begin{bmatrix} 0 & 1 \\ 0 & 0 \end{bmatrix}$ in the C^*-algebra $M_2(\mathcal{C}) \simeq B(\mathcal{C}^2)$. Then $sp(x) = \{0\}$. So $r(x) = 0$. But $\| x \| = 1$ (since its associated operator $T(z_1, z_2) = (z_2, 0)$ has norm 1).