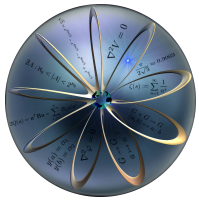

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a closed subset of a complete metric space is complete

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Let X be a complete metric space, and let $Y \subseteq X$ be a closed subset of X. Then Y is complete.

Proof

Let $\{y_n\} \subseteq Y$ be a Cauchy sequence in Y. Then by the completeness of X, $y_n \to x$ for some $x \in X$. Then every neighborhood of x contains points in Y, so $x \in \overline{Y} = Y$.