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surjective

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Defines	surjection

A function $f: X \rightarrow Y$ is called *surjective* or *onto* if, for every $y \in Y$, there is an $x \in X$ such that $f(x) = y$.

Equivalently, $f: X \rightarrow Y$ is onto when its image is all the codomain:

$$\text{Im}f = Y.$$

Properties

1. If $f: X \rightarrow Y$ is any function, then $f: X \rightarrow f(X)$ is a surjection. That is, by restricting the codomain, any function induces a surjection.
2. The composition of surjective functions (when defined) is again a surjective function.
3. If $f: X \rightarrow Y$ is a surjection and $B \subseteq Y$, then (see <http://planetmath.org/InverseImage> this page)

$$ff^{-1}(B) = B.$$