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Math 501 Homework (§4.2 Limits of Functions)

Problem 1. Show that $\lim_{x\to c} x^2 = c^2$.

Solution. We start with defining $g(x) : x$ and $f(x) : x^2$. It is easy to see f as a **product function** ($f = gg$) and $f(x) = (gg)(x) = g(x)g(x)$.
A theorem states that $\lim_{x\to c}(g(x)g(x)) = \lim_{x\to c} g(x) \times \lim_{x\to c} g(x)$, and since according to another, $\lim_{x\to c} x = c$, we have

$$\lim_{x\to c} f(x) = c \times c = c^2$$

□