

Objective: Verify that one function is the inverse function of another function.

Justify that the functions $f(x) = x^3 + 2$ and $g(x) = \sqrt[3]{x-2}$ are inverses.

ANSWER:

First we must check if $f(g(x)) = x$.

$$\begin{aligned} f(g(x)) &= (\sqrt[3]{x-2})^3 + 2 \\ &= x - 2 + 2 \\ &= x \end{aligned}$$

Now, we must check if $g(f(x)) = x$.

$$\begin{aligned} g(f(x)) &= \sqrt[3]{(x^3 + 2) - 2} \\ &= \sqrt[3]{x^3 + 2 - 2} \\ &= \sqrt[3]{x^3} \\ &= x \end{aligned}$$

Therefore, the two functions are inverses.