

- Show that  $f(x) = (x - 2)^3 + 1$  and  $g(x) = \sqrt[3]{x - 1} + 2$  are inverses.

$$\begin{aligned} f(g(x)) &= (g(x) - 2)^3 + 1 \\ &= (\sqrt[3]{x-1} + \cancel{2} - \cancel{2})^3 + 1 \\ &= (\sqrt[3]{x-1})^3 + 1 \\ &\quad \cancel{x-1} + 1 = x \end{aligned}$$

$$\begin{aligned} g(f(x)) &= \sqrt[3]{f(x) - 1} + 2 \\ &= \sqrt[3]{(x-2)^3 + \cancel{x} - \cancel{x}} + 2 \\ &= \sqrt[3]{(x-2)^3} + 2 \\ &= \cancel{x-2} + \cancel{2} = x \end{aligned}$$

$$f(g(x)) = x \quad \text{AND} \quad g(f(x)) = x \quad \checkmark$$