1. $f(x) = x^3 - 5 \quad g(x) = \sqrt[3]{x+5}$

$f \circ g = f(g)$

$= (g)^3 - 5$

BUT $g = \sqrt[3]{x+5}$

SO

$= \left(\sqrt[3]{x+5}\right)^3 - 5$

$= x + 5 - 5$

$= x$ ✓

$g \circ f = g(f)$

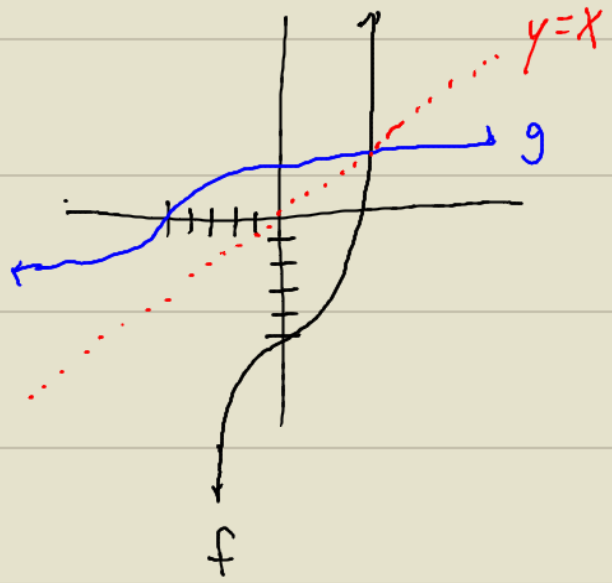
$= \sqrt[3]{(f)+5}$

$= \sqrt[3]{x^3 - 5 + 5}$

$= \sqrt[3]{x^3}$

$= x$ ✓

INVERSES



NOTE: INVERSE FUNCTIONS ARE SYMMETRIC TO THE LINE $y = x$

2. $f(x) = \frac{2}{(3-x)} \quad g(x) = \frac{(3x-2)}{x}$

$f \circ g = f(g)$

$= \frac{2}{3-(g)}$

$= \frac{2}{3-\left(\frac{3x-2}{x}\right)}$

$= \frac{2x}{3x - x\left(\frac{3x-2}{x}\right)}$

$= \frac{2x}{3x - (3x-2)}$

$= \frac{2x}{3x - 3x + 2}$

$= \frac{2x}{2}$

$= x$ ✓

$g \circ f = g(f)$

$= \frac{3(f) - 2}{(f)}$

$= \frac{3\left(\frac{2}{3-x}\right) - 2}{\frac{2}{3-x}}$

$= \frac{\frac{6}{3-x} - 2}{\frac{2}{3-x}}$

$= \frac{(3-x)\left(\frac{6}{3-x}\right) - 2(3-x)}{(3-x)\left(\frac{2}{3-x}\right)}$

$= \frac{6 - 6 + 2x}{2}$

$= \frac{2x}{2}$

$= x$ ✓

INVERSES