$\frac{x+3}{x-2} = f$ $\quad g = \frac{2x+3}{x-1}$

$f(g(x))$ $\quad g(f(x))$

$$\frac{2\left(\frac{x+3}{x-2}\right)+3\left(\frac{x-2}{x-2}\right)}{\left(\frac{x+3}{x-2}\right)-1\left(\frac{x-2}{x-2}\right)}$$

$$\frac{\frac{2x+6+3x-6}{x-2}}{\frac{x+3-x+2}{x-2}} \cdot \frac{x-2}{x+3-x+2}$$

$$\frac{5x}{5} = x$$

21)

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

$D: (-\infty, \infty)$ $\quad D: \mathbb{R}$

$R: (-\infty, \infty)$ $\quad R: \mathbb{R}$

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

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

$x^3 = y+5$

$x^3 - 5 = y$

$f^{-1}(x) = x^3 - 5$

Prove a function is one to one algebraically

$f(a) = f(b) \Rightarrow a = b$

$f(x) = 3x + 2$

$3a + 2 = 3b + 2$
$-2 \quad -2$

$\frac{3a}{3} = \frac{3b}{3}$

$a = b$

$f(x) = x^3 - x + 1$

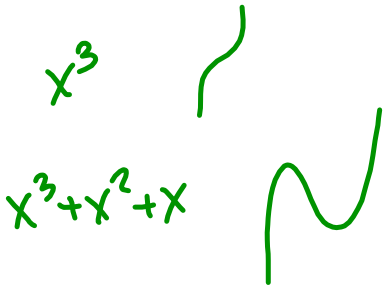
$a^3 - a + 1 = b^3 - b + 1$
$-1 \quad -1$

$a^3 - a = b^3 - b$
$-b^3 + a \quad -b^3 + a$

$a^3 - b^3 = a - b$

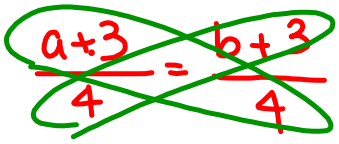
$\frac{(a-b)(a^2+ab+b^2)}{(a-b)} = \frac{a-b}{a-b}$

$a^2 + ab + b^2 = 1$ ← not 1:1



From HW prove 1:1, algebraically

28) USE only f(x)



$\frac{4(a+3)}{4} = \frac{4(b+3)}{4}$

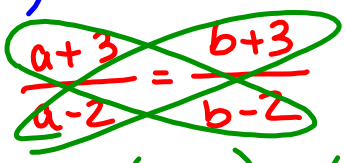
$a+3 = b+3$

$-3 \quad -3$

$a = b$ ✓

$f(x)$ = 1:1

32)



$(a-2)(b+3) = (a+3)(b-2)$

$ab+3a-2b-b = ab-2a+3b-b$

$3a-2b = -2a+3b$

$+2a \quad +2b \quad +2a \quad +2b$

$5a = 5b$

$a = b$

Try 1:1 algebraically

- $f(x) = x^2 - 9$

$a^2 - 9 = b^2 - 9$

$+9 \quad +9$

$a^2 = b^2$

$a^2 - b^2 = 0$

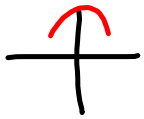
$(a+b)(a-b) = 0$

$a+b=0 \quad a-b=0$

$a=-b \quad a=b$

Not 1:1

- $f(x) = \sqrt{4-x^2}$



$\sqrt{4-a^2} = \sqrt{4-b^2}$

$4-a^2 = 4-b^2$

$-a^2 = -b^2$

$a^2 = b^2$

Not 1:1