16) $f(x) = \dfrac{x+3}{x-2}$

$y = \dfrac{x+3}{x-2}$

$x = \dfrac{y+3}{y-2}$

$(y-2)\cdot x = y+3$

$xy - 2x = y+3$

$xy - 2x = y + 3$

$\quad +2x \quad -y$

$xy - y = 2x + 3$

$y(x-1) = 2x+3$

$y = \dfrac{2x+3}{x-1}$

$f^{-1}(x) = \dfrac{2x+3}{x-1}$

Domain f^{-1}

$(-\infty, 1) \cup (1, \infty)$

14) $f^{-1}(x) = \frac{1}{2}x - \frac{5}{2}$

$= \dfrac{x-5}{2}$

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

18) $f^{-1}(x) = x^2 - 2$

22) $f^{-1}(x) = x^3 + 2$

18) work

$f(x) = \sqrt{x+2}$

$y = \sqrt{x+2}$

$x = \sqrt{y+2}$

$x^2 = y+2$

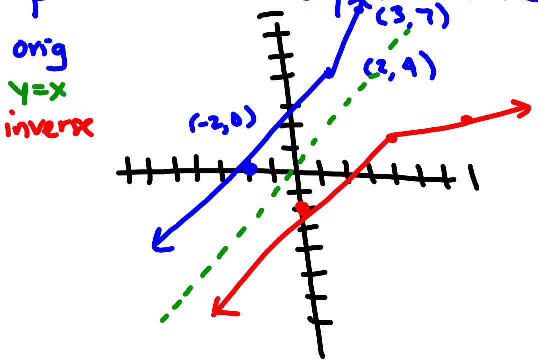
$x^2 - 2 = y$

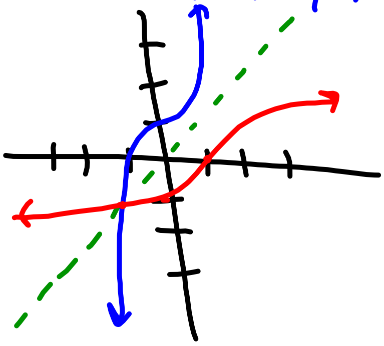
$f^{-1}(x) = x^2 - 2$

1.5 (Continued)

Inverse Reflection Principle

The points (a,b) and (b,a) in the coordinate plane are symmetric with the line $y=x$





Inverse Composition Rule

A function f is one-to-one w/ inverse function g iff

$f(g(x)) = x$ for every x in domain g

$g(f(x)) = x$ for every x in domain f

Ex Verifying Inverse Functions

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

$f(g(x))$

$\left(\sqrt[3]{x-1}\right)^3 + 1$

$x - 1 + 1$

x

$g(f(x))$

$\sqrt[3]{(x^3+1)-1}$

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

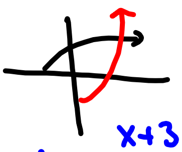
x

Yes, f(x) and g(x) are inverses

Ex Show $f(x) = \sqrt{x+3}$ has an inverse. (Find $f^{-1}(x)$)

$f^{-1}(x) = x^2 - 3$

f(x)



Domain: $x+3 \geq 0$, $x \geq -3$ $[-3, \infty)$

Range: $[0, \infty)$

Domain: $[0, \infty)$

Range: $[-3, \infty)$

$y = \sqrt{x+3}$

$x = \sqrt{y+3}$

$x^2 = y + 3$

$x^2 - 3 = y$

$f^{-1}(x) = x^2 - 3$

Bookwork: p135 # 24-32 evens / 21 domain/range

32) $f(x) = \frac{x+3}{x-2}$ $g(x) = \frac{2x+3}{x-1}$

$f(g(x))$

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

$$\frac{\frac{2x+3+3x-3}{x-1}}{\frac{2x+3-2x+2}{x-1}}$$

$$\frac{\cancel{5}x}{\cancel{(x-1)}} \cdot \frac{\cancel{(x-1)}}{\cancel{5}} = x$$