Inverses

If $y = 3x+2$, complete the table of values

x	y
0	
1	
$1/2$	$7/2$
	7
	-2
	3

Find the inverses of $f(x) = x+3$, $g(t) = 5t$, $\varphi(a) = a^3$, $\psi(y) = 2^y$, $h(z) = \frac{1}{z}$

Find h^{-1} where $h(t) = \dfrac{5t^3+7}{2}$

If $\pi = AK^{1/4}$ where A is constant, find K in terms of π

Inverses

If $y=3x+2$, complete the table of values

x	y
0	2
1	5
$1/2$	$7/2$
$5/3$	7
$-\frac{4}{3}$	-2
$1/3$	3

$y = 3\times 0+2 = 0+2 = 2$

$y = 3\times 1+2 = 3+2 = 5$

$7 = 3x+2$

$-2 \qquad 5 = 3x \qquad -2$

$\div 3 \qquad \frac{5}{3} = x \qquad \div 3$

$x = \frac{(-2)-2}{3} = \frac{-4}{3}$

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

$y = 3x+2$

$-2 \qquad y-2 = 3x \qquad -2$

$\div 3 \qquad \frac{y-2}{3} = x \qquad \div 3$

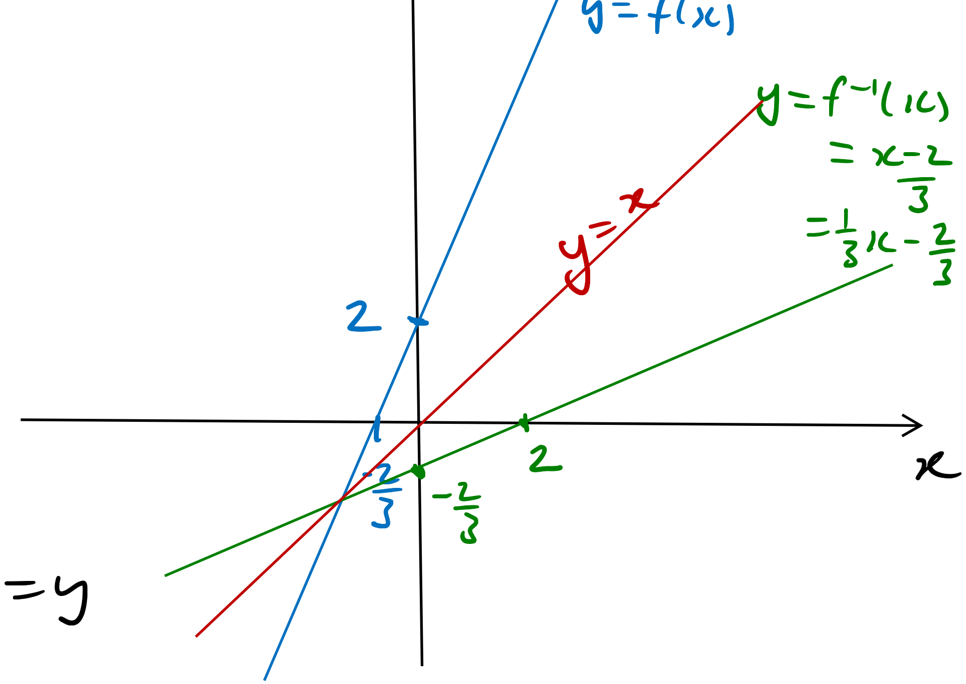
$$\boxed{x = \frac{y-2}{3}}$$

$$y = f(x) = 3x+2$$

$$x = \underbrace{f^{-1}}_{\text{inverse of } f}(y) = \frac{y-2}{3}$$

$$f(f^{-1}(y)) = 3\times f^{-1}(y) + 2 = \cancel{3}\left(\frac{y-2}{\cancel{3}}\right)+2 = y$$

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



$\boxed{\text{Inverses}}$

$f^{-1}(y) \neq (f(y))^{-1} = \frac{1}{f(y)}$

Find the inverses of

$f(x) = x + 3$

$y = f(x)$
$y = x + 3$
$y - 3 = x$

$x = \underline{f^{-1}(y) = y - 3}$

$g(t) = 5t$

$u = g(t)$
$u = 5t$
$\frac{u}{5} = t$

$t = \underline{g^{-1}(u) = \frac{u}{5}}$

$\varphi(a) = a^3$

$b = \varphi(a)$
$b = a^3$
$\sqrt[3]{b} = a$

$a = \varphi^{-1}(b) = \sqrt[3]{b}$

$\psi(y) = 2^y$

$z = \psi(y)$
$z = 2^y$
$\log_2 z = y$

$y = \psi^{-1}(z) = \log_2(z)$

$h(z) = \frac{1}{z}$

$x = h(z)$
$x = \frac{1}{z}$
$zx = 1$
$z = \frac{1}{x}$

$z = h^{-1}(x) = 1/x = h(x)$

Inverses

Find h^{-1} where $h(t) = \dfrac{5t^3+7}{2}$

$u = h(t)$

AIM $t = h^{-1}(u)$

$$u = \frac{5t^3+7}{2}$$

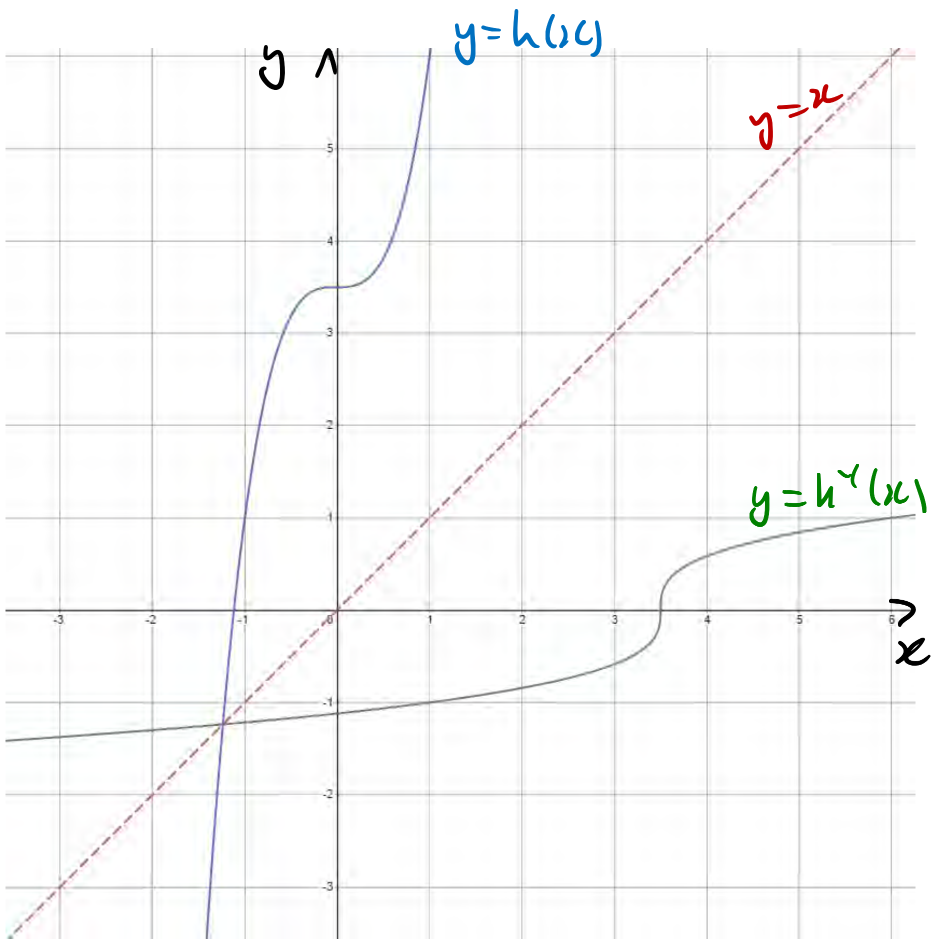
$$2u = 5t^3 + 7$$

$$2u - 7 = 5t^3$$

$$\frac{2u-7}{5} = t^3$$

$$\sqrt[3]{\frac{2u-7}{5}} = t$$

$$h^{-1}(u) = \sqrt[3]{\frac{2u-7}{5}}$$



Inverses

If $\pi = AK^{1/4}$ where A is constant, find K in terms of π

$\pi = f(K) = AK^{1/4}$, $\overline{\underline{AIM}}$ $K = f^{-1}(\pi)$

$\pi = AK^{1/4}$

$\frac{\pi}{A} = K^{1/4} = \sqrt[4]{K}$

$\left(\frac{\pi}{A}\right)^4 = K$

$$\underline{\underline{K = \frac{\pi^4}{A^4}}}$$

Inverses

Is $f(x) = x^2$ invertible?

$y = f(x)$ AIM $x = f^{-1}(y)$

$y = x^2$

$\sqrt{y} = x$

$(-2)^2 = 4$

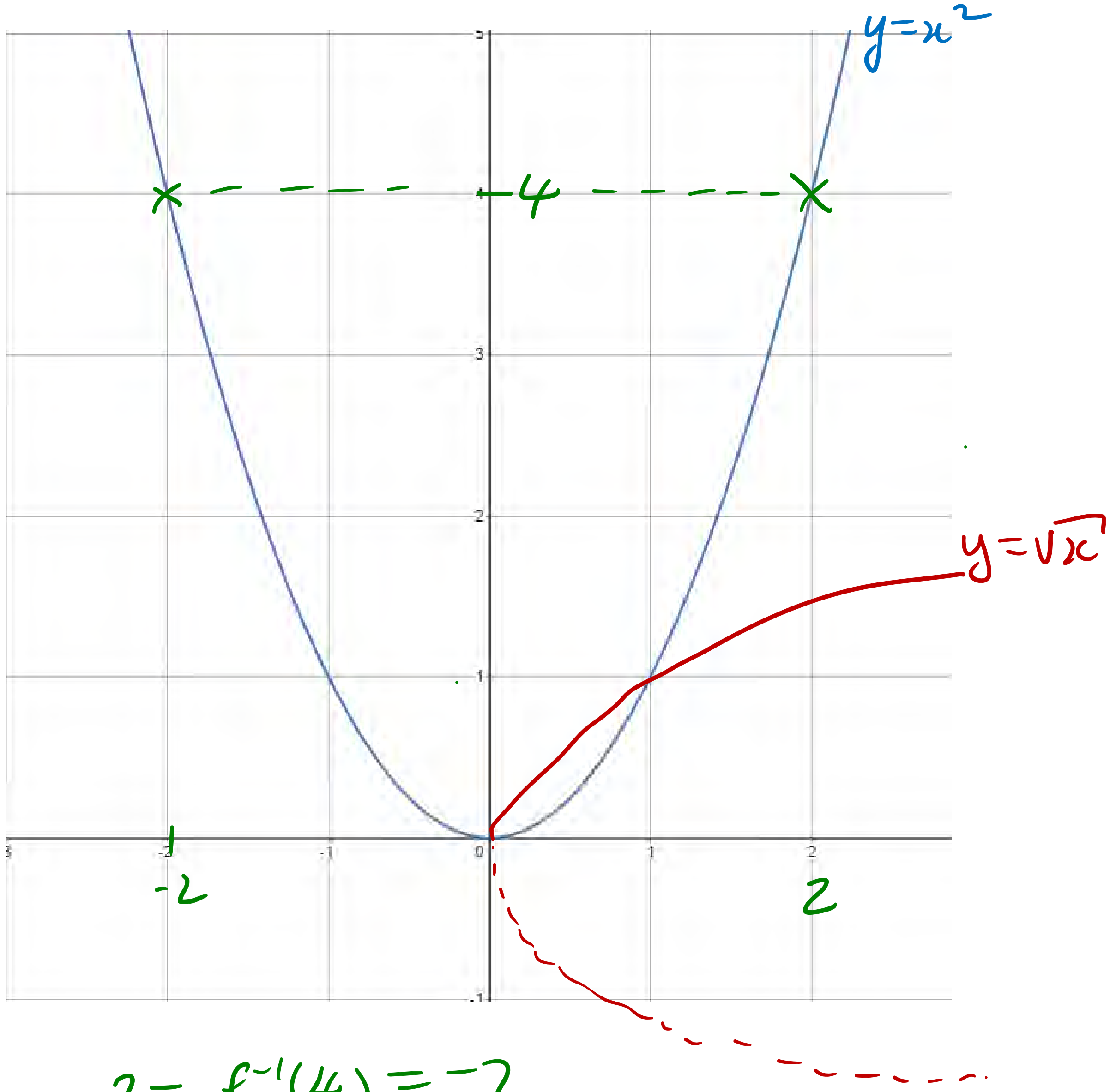
$f^{-1}(f(x)) = x$

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

$f^{-1}(4) = 2$

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

$f^{-1}(4) = -2$



$2 = f^{-1}(4) = -2$