

6.2

fcn = function

INVERSE FUNCTIONS

f		f ⁻¹ (inverse)	
x	y	x	y
1	4	4	1
2	5	5	2
3	6	6	3

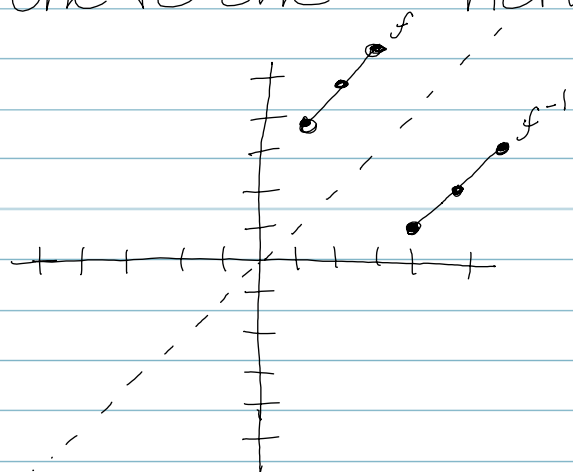
f		f ⁻¹	
x	y	x	y
1	4	4	1
2	4	4	2
3	4	4	3

not an inverse (not a fcn)

* both x & y are unique → one-to-one (no repeats)

function → vertical line test

One to one → horizontal line test



$$\begin{aligned}
 f(x) &= 3x + 4 \\
 y &= 3x + 4 \\
 x &= 3y + 4 \\
 x - 4 &= 3y \\
 3y &= x - 4 \\
 y &= \frac{1}{3}(x - 4) \\
 y &= \frac{x - 4}{3} = \frac{1}{3}(x - 4) \\
 f^{-1}(x) &= \frac{x - 4}{3}
 \end{aligned}$$

- ① let $y = f(x)$
- ② interchange the x & y values
- ③ solve for y
- ④ new $y = f^{-1}$

* To prove that f^{-1} is really an inverse, then

$$\begin{aligned}
 \text{① } f(f^{-1}(x)) &= x & \text{and } \text{② } f^{-1}(f(x)) &= x \\
 f\left(\frac{x-4}{3}\right) &= 3\left(\frac{x-4}{3}\right) + 4 & f^{-1}(3x+4) &= \frac{3x+4-4}{3} = \frac{3x}{3} = x \\
 &= x - 4 + 4 & & \\
 &= x & &
 \end{aligned}$$