

①

ASSIGNMENT # 7
SOLUTIONS
201-009-50
FUNCTIONS & Trig

p. 124

#5 (c) $y = -3x + 7$

inverse x & y

$$x = -3y + 7$$

$$3y = -x + 7$$

$$y = -\frac{1}{3}x + \frac{7}{3}$$

so $f^{-1}(x) = -\frac{1}{3}x + \frac{7}{3}$

(d) $y = \frac{2}{5}x - 1$

inverse x & y

$$x = \frac{2}{5}y - 1$$

$$x + 1 = \frac{2}{5}y$$

$$\frac{5}{2}(x + 1) = y$$

$$y = \frac{5}{2}x + \frac{5}{2}$$

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

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

inverse x & y

$$x = \frac{2y}{y+1}$$

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

$$xy + x = 2y$$

$$xy - 2y = -x$$

$$y(x-2) = -x$$

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

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

(h) $f(x) = \frac{x-1}{x+1}$

inverse x & y

$$x = \frac{y-1}{y+1}$$

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

$$xy + x = y-1$$

$$xy - y = -x-1$$

$$y(x-1) = -x-1$$

$$y = \frac{-x-1}{x-1} = \frac{-(x+1)}{-(1-x)} = \frac{x+1}{1-x}$$

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

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

(4)

f has domain $[-2, \infty)$
 range $[0, \infty)$

x	$f(x)$
-2	0
-1	1
2	2

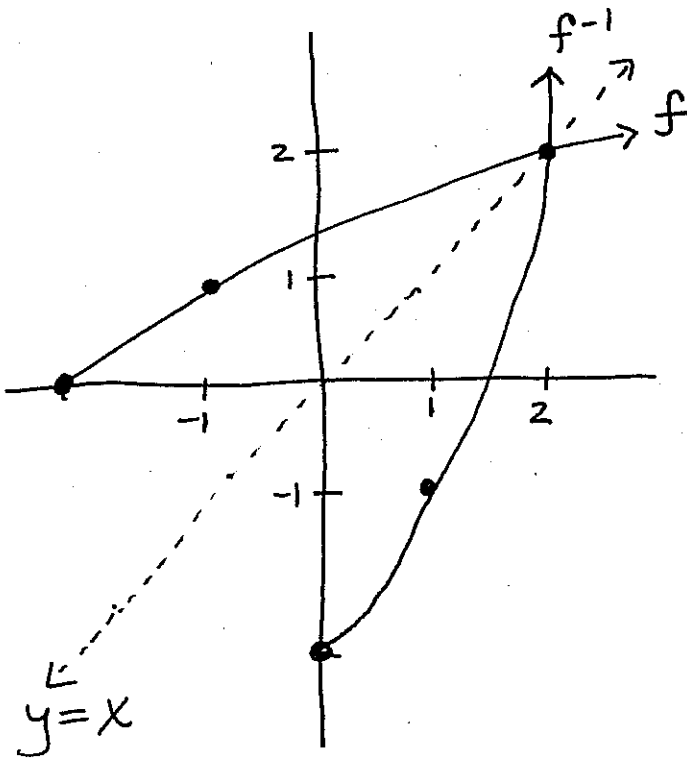
So f^{-1} has domain $[0, \infty)$
 range $[-2, \infty)$

$x = \sqrt{y+2}$ square both sides

$x^2 = y+2$

$x^2 - 2 = y$

$f^{-1} = x^2 - 2 \quad x \geq 0$



x	$f^{-1}(x)$
0	-2
1	-1
2	2

#7(b) $f(x) = x + 3$

Inverse x & y

$x = y + 3$

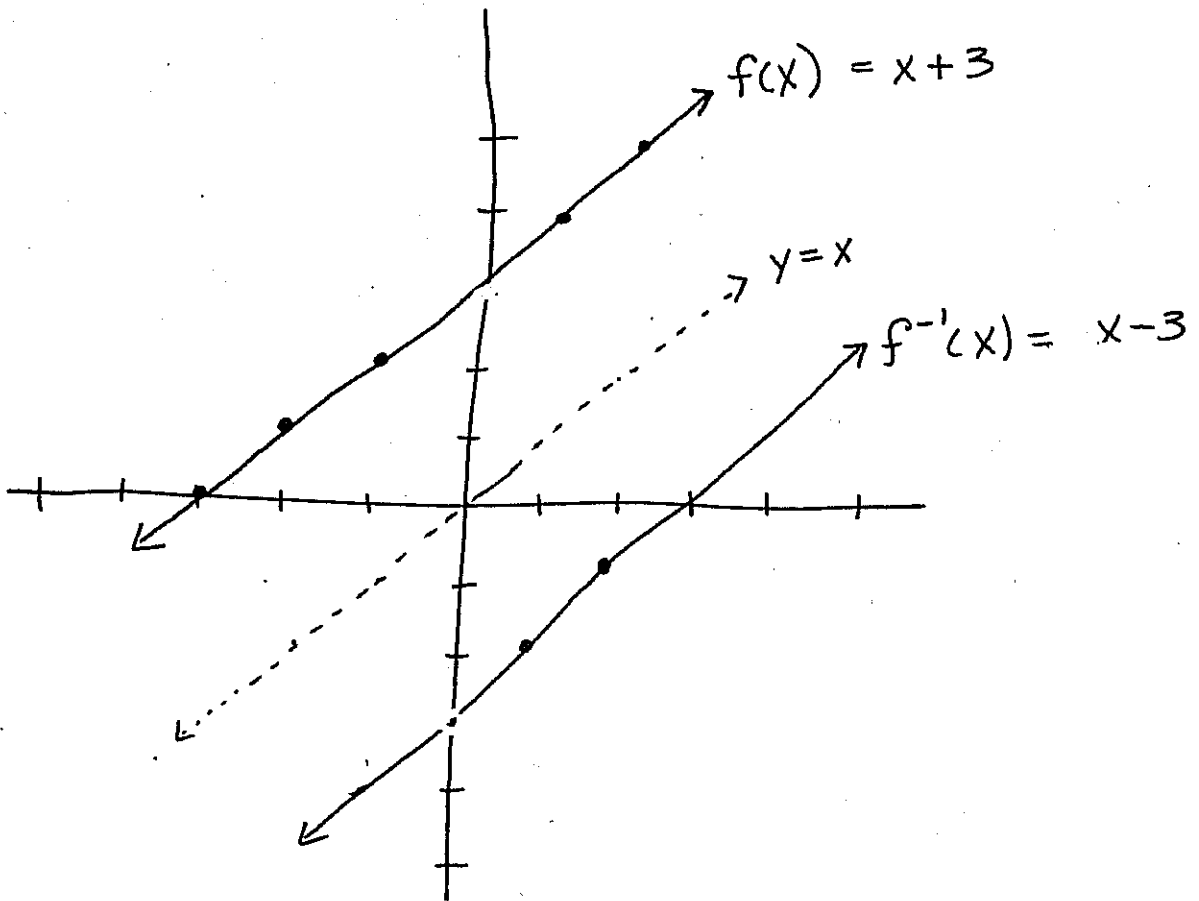
$y = x - 3$

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

TABLES OF values

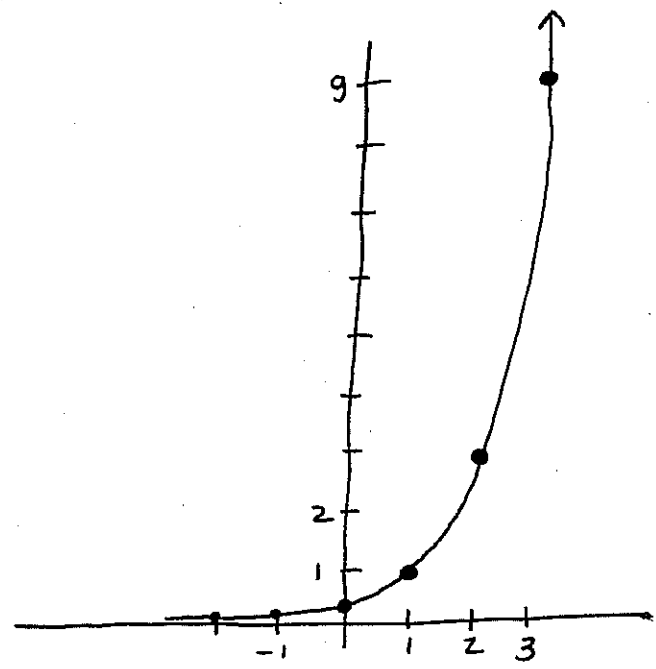
x	$f(x)$	x	$f^{-1}(x)$
-2	1	-2	-5
-1	2	-1	-4
0	3	0	-3
1	4	1	-2
2	5	2	-1

Both f & f^{-1} are lines so they both have domain & range \mathbb{R}



P. 132 #7 $y = 3^{x-1}$

x	y
-2	$3^{-3} = 1/27$
-1	$3^{-2} = 1/9$
0	$3^{-1} = 1/3$
1	$3^0 = 1$
2	$3^1 = 3$
3	$3^2 = 9$



#8 $y = (\frac{1}{3})^x - 2$

x	y
-2	$(\frac{1}{3})^{-2} - 2 = 9 - 2 = 7$
-1	$(\frac{1}{3})^{-1} - 2 = 3 - 2 = 1$
0	$1 - 2 = -1$
1	$\frac{1}{3} - 2 = -5/3$
2	$(\frac{1}{3})^2 - 2 = -17/9$

