p149 1. $f(2)=6 \rightarrow (2,6)$

$f^{-1}(6) = \rightarrow (6,2) = 2$

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

c $f(f^{-1}(7))=7$ because $f(f^{-1}(x))=x$.

2. $f(0)=-1 \rightarrow (0,-1)$; inverse $(-1,0) \rightarrow f^{-1}(-1)=0$.

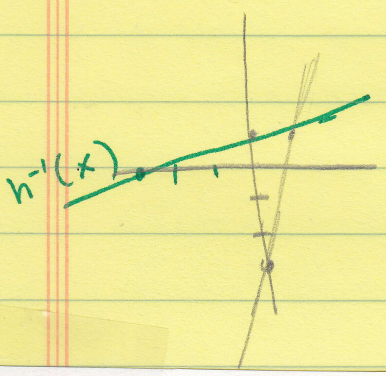
b $f^{-1}(f(0))=0$

c $f(f^{-1}(2))=2$.

3. $g(3)=5$ $g(-1)=5$

g has no inverse because it is not one to one

5. $h(x)=4x-3$



x	y
0	-3
1	1

x	y
-3	0
1	1

$y=4x-3$

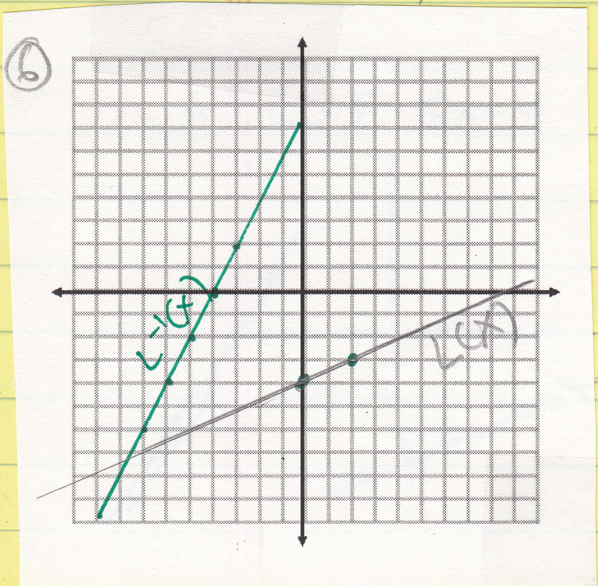
$x=4y-3$

$4y=x+3$

$y=\frac{x+3}{4}$

$h^{-1}(x)=\frac{x+3}{4}$

6



$L(x)=\frac{1}{2}x-4 \rightarrow y=\frac{1}{2}x-4$

x	y
0	-4
2	-3

x	y
-4	0
-3	2

$x=\frac{1}{2}y-4$

$2x=y-8$

$y=2x+8$

$L^{-1}(x)=2x+8$

7. yes it's one to one (passes Horizontal & Vertical line test)

8. no : it's not 1 to 1
doesn't pass the horizontal line test

9. no : it's not 1 to 1
doesn't pass the HLT

10 yes : it's one to one (passes HLT & VLT)

11. $f(x) = 3x-5$ has an inverse

$y = 3x-5$

$x = 3y-5$

$3y = x+5$

$y = \frac{x+5}{3}$

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

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

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

$f(f^{-1}(x)) = f\left(\frac{x+5}{3}\right)$

$= 3\left(\frac{x+5}{3}\right) - 5 = x+5-5 = x$

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

13. $f(x) = \sqrt[4]{x}$

$y = \sqrt[4]{x}$

$x = \sqrt[4]{y}$

$y = x^4$

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

$f^{-1}(f(x)) = f^{-1}(\sqrt[4]{x}) = (\sqrt[4]{x})^4 = x$

$f(f^{-1}(x)) = f(x^4) = \sqrt[4]{x^4} = x$

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

15 $f(x) = \frac{1}{x^2}$

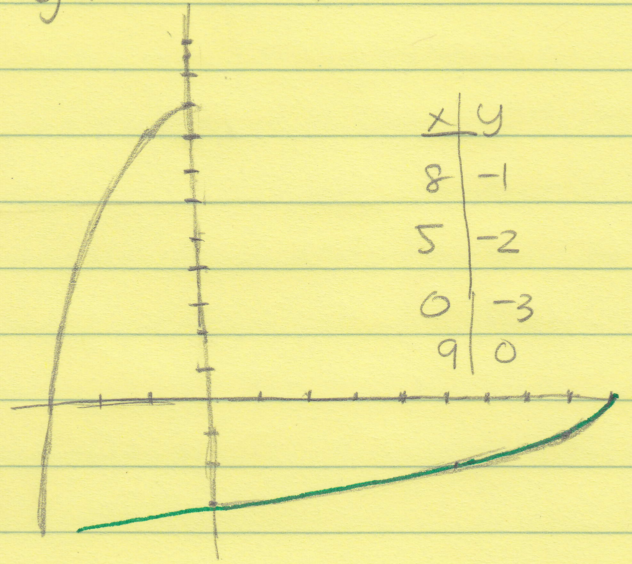
$x = \frac{1}{y^2} \rightarrow xy^2 = 1 \rightarrow y^2 = \frac{1}{x} \rightarrow y = \pm\sqrt{\frac{1}{x}}$

no inverse

not 1 to 1

21 $g(x) = 9 - x^2;\ x \le 0$

x	y
-1	8
-2	5
-3	0
0	9



x	y
8	-1
5	-2
0	-3
9	0

$y = 9 - x^2$

$x = 9 - y^2$

$y^2 = 9 - x$

$y = -\sqrt{9-x}$

$x \le 9$.

p128

6 $f(x) = x^3 - 1$; $g(x) = x - 1$

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

$= x^3 - x$

p135 CE

3a $x^4 + y^4 = 1$

x axis $\rightarrow y \rightarrow -y$: $x^4 + (-y)^4 = 1$

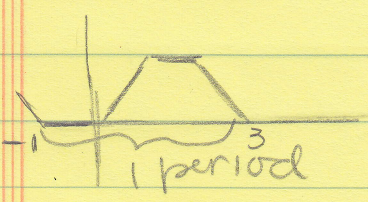
$x^4 + y^4 = 1$ ✓ same as original

y axis : $x \rightarrow -x$: $(-x)^4 + y^4 = 1 \rightarrow x^4 + y^4 = 1$ ✓

$y = x$ switch x & y : $y^4 + x^4 = 1$ — this is the same as $x^4 + y^4 = 1$ ✓

origin : $x \rightarrow -x,\ y \rightarrow -y$: $(-x)^4 + (-y)^4 = x^4 + y^4 = 1$ ✓

p142 CE #1



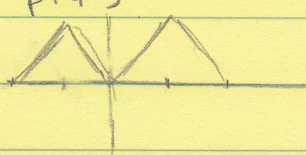
period = 4

Amplitude: $\frac{1-0}{2} = \frac{1}{2}$

$f(25) = \frac{25}{4} = 6R1 \rightarrow f(1) = 1$

$f(-25) = f(-1) = 0$

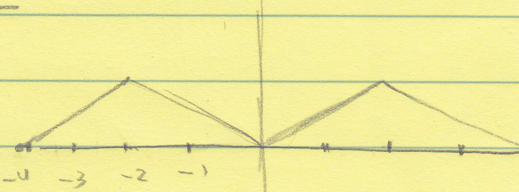
p143

5d 

-2	-1	0	1	2
0	1	0	1	0

$f(\frac{1}{2}x)$

-4	-2	0	2	4
0	1	0	1	0



5f $f(-x)+1$ opposite x ; $y+1$

2	1	0	-1	-2
1	2	1	2	1