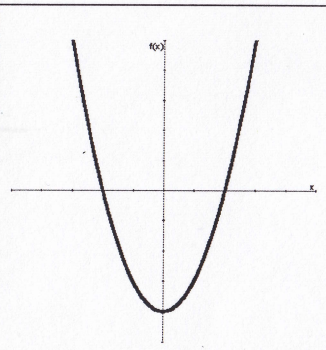
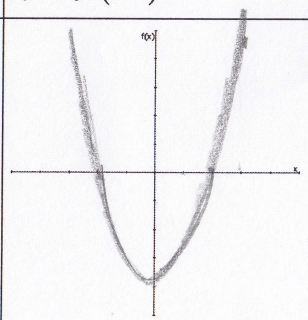
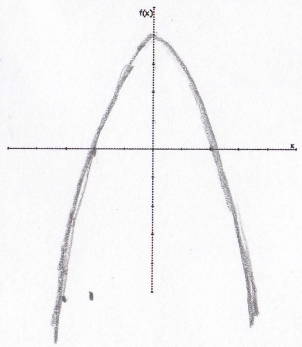
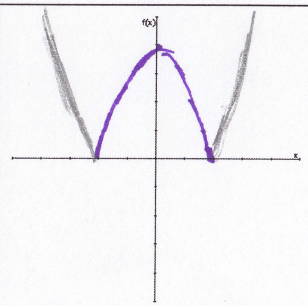
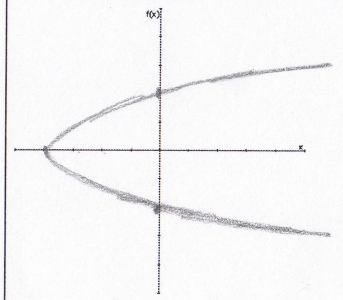
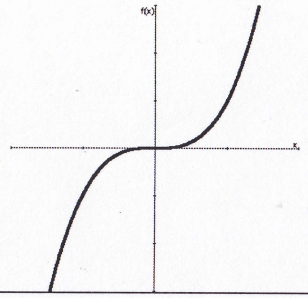
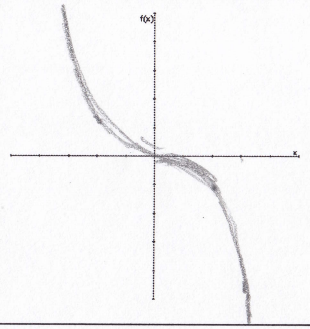
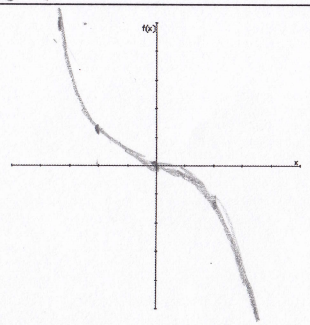
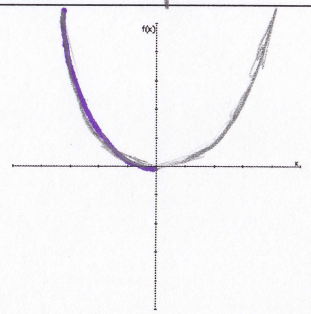
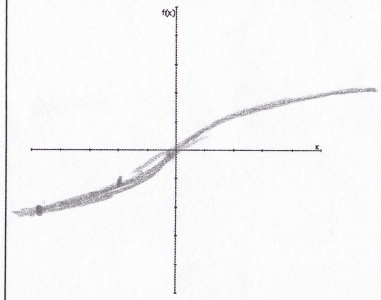
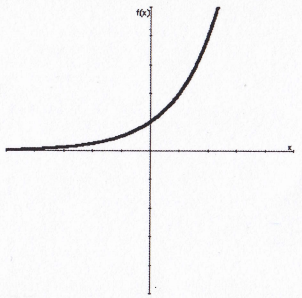
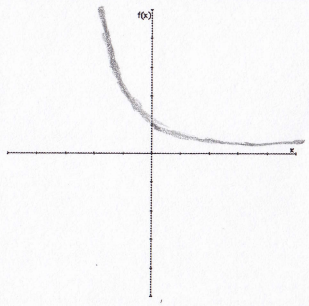
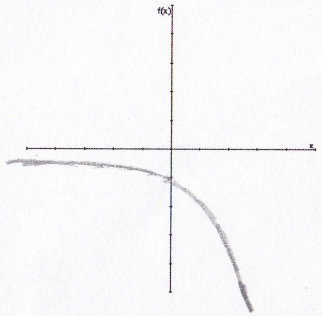
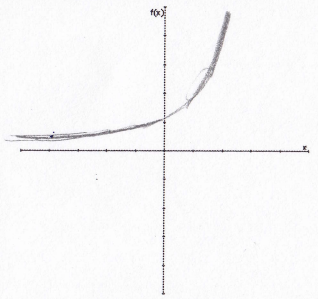
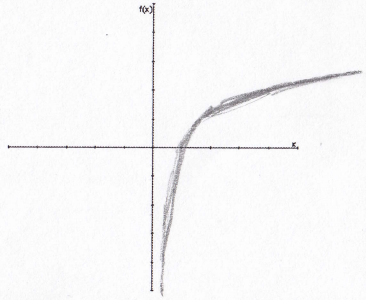
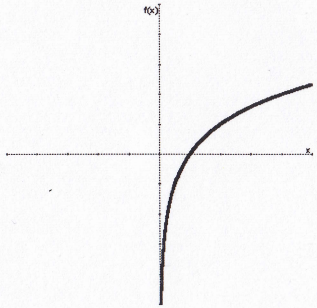
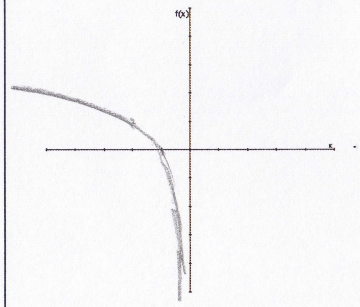
$y = f(x)$	$y = f(-x)$	$y = -f(x)$	$y = \lvert f(x) \rvert$	Interchange x and y
				
x | -3 | -2 | 0 | 2 | 3 y | 10 | 0 | -4 | 0 | 10	x | 3 | 2 | 0 | -2 | -3 y | 10 | 0 | 4 | 0 | 10	x | -3 | -2 | 0 | 2 | 3 y | -10 | 0 | 4 | 0 | -10	x | -3 | -2 | 0 | 2 | 3 y | 10 | 0 | 4 | 0 | 10	x | 10 | 0 | -4 | 0 | 10 y | -3 | -2 | 0 | 2 | 3
				
x | -3 | -2 | 0 | 2 | 3 y | -10 | -1 | 0 | 1 | 10	x | 3 | 2 | 0 | -2 | -3 y | -10 | -1 | 0 | 1 | 10	x | -3 | -2 | 0 | 2 | 3 y | 10 | 1 | 0 | -1 | -10	x | -3 | -2 | 0 | 2 | 3 y | 10 | 1 | 0 | 1 | 10	x | -10 | -1 | 0 | 1 | 10 y | -3 | -2 | 0 | 2 | 3
				
x | -10 | 0 | 1 | 3 y | 0.0... | 1 | 2 | 10...	x | 10 | 0 | -1 | -3 y | 10.00 | 1 | 2 | 10...	x | -10 | 0 | 1 | 3 y | -0.0... | -1 | -2 | -10	x | -10 | 0 | 1 | 3 y | 0.0 | 1 | 2 | 10	x | 0.00... | 1 | 2 | 10... y | -10 | 0 | 1 | 3

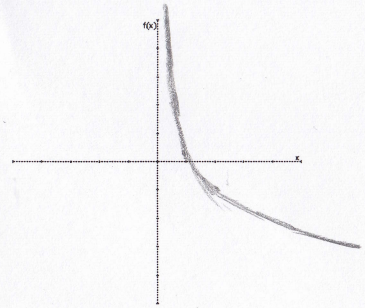
all y values already positive in the original fcn



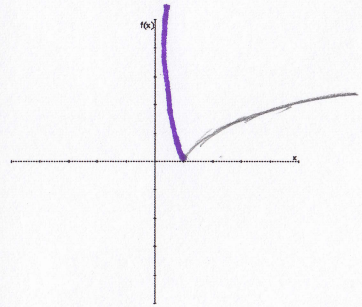
x	0.00	1	2	10
y	$-\infty$	0	1	3



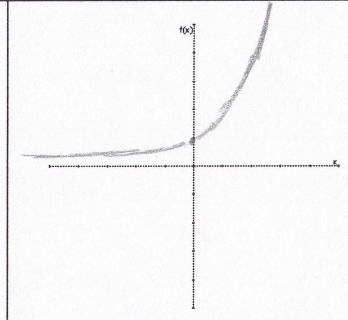
x	-0.00	-1	-2	-10
y	$-\infty$	0	1	3



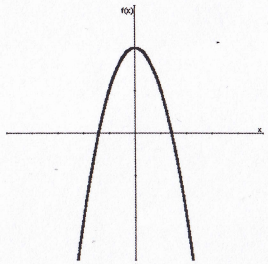
x	0.00	1	2	10
y	∞	0	-1	-3



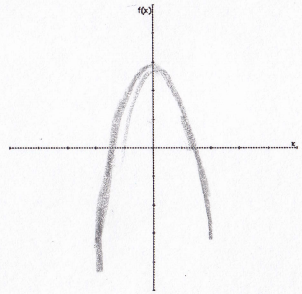
x	0.00	1	2	10
y	∞	0	1	3



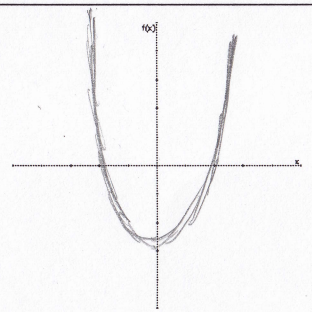
x	$-\infty$	0	1	3
y	0.00	1	2	10



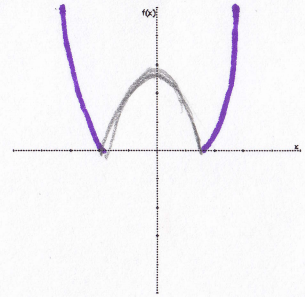
x	-2	-1	0	1	2
y	-10	0	3	0	-10



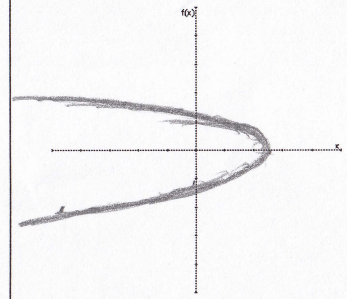
x	2	1	0	-1	-2
y	-10	0	3	0	-10



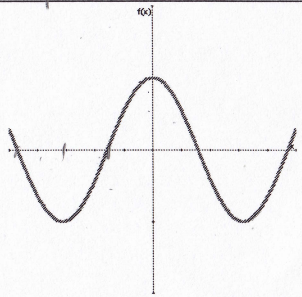
x	-2	-1	0	1	2
y	10	0	-3	0	10



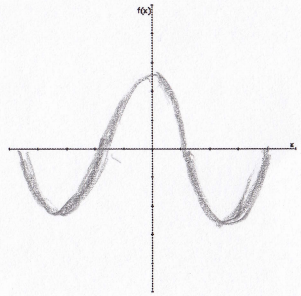
x	-2	-1	0	1	2
y	**10**	0	3	0	**10**



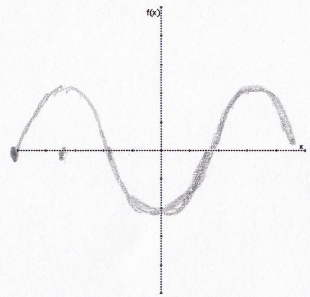
x	-10	0	3	0	-10
y	-2	-1	0	1	2



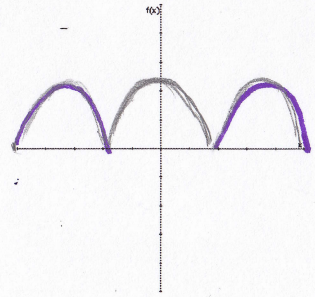
x	-3	-2	-1	0	1	2	3
y	0	-2	0	2	0	-2	0



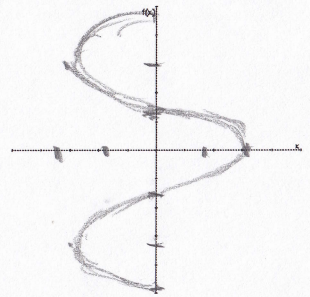
x	3	2	1	0	-1	-2	-3
y	0	-2	0	2	0	-2	0



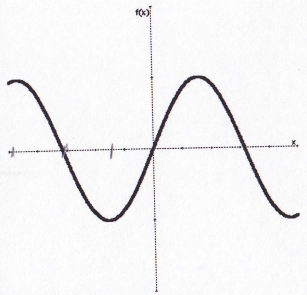
x	-3	-2	-1	0	1	2	3
y	0	2	0	-2	0	2	0



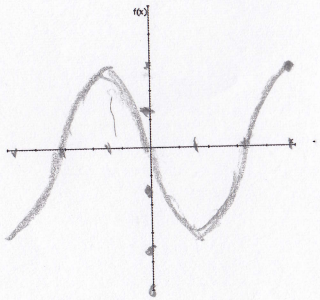
x	-3	-2	-1	0	1	2	3
y	0	2	0	2	0	2	0



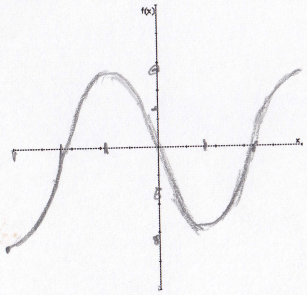
x	0	-2	0	2	0	-2	0
y	-3	-2	-1	0	1	2	3



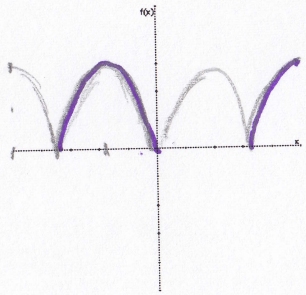
x	-3	-2	-1	0	1	2	3
y	2	0	-2	0	2	0	-2



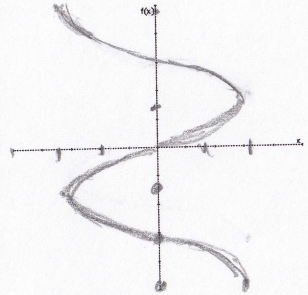
x	3	2	1	0	-1	-2	-3
y	2	0	-2	0	2	0	-2



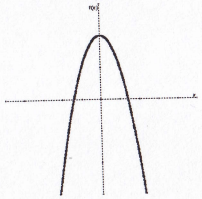
x	-3	-2	-1	0	1	2	3
y	-2	0	2	0	-2	0	2



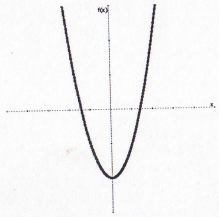
x	-3	-2	-1	0	1	2	3
y	2	0	2	0	2	0	2



x	2	0	-2	0	2	0	-2
y	-3	-2	-1	0	1	2	3

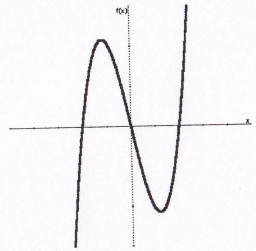


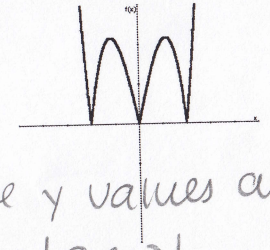
x	y
-2	-10
-1	0
0	3
1	0
2	-10



x	y
-2	10
-1	0
0	-3
1	0
2	10

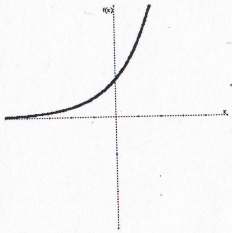
opposite y → $y = -f(x)$





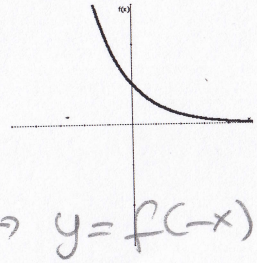
all the y values are +

$y = |f(x)|$

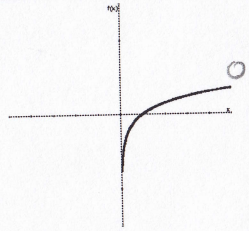


x	y
-10	0
0	1
2	10

x	y
10	0
0	1
-2	10

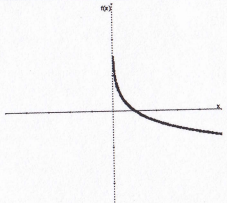


opposite x → $y = f(-x)$

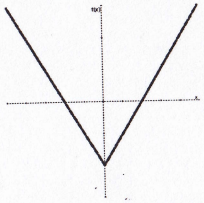


x	y
0.0...	-∞
1	0
3	1

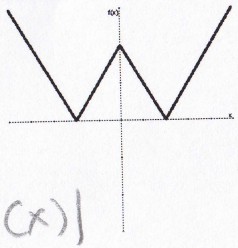
x	y
0.0...	∞
1	0
3	-1



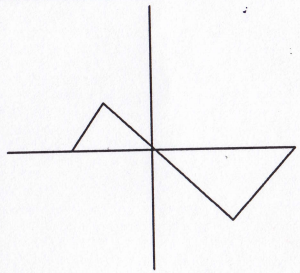
opposite y → $y = -f(x)$



all y values are pos

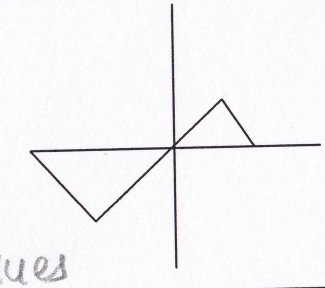


$y = |f(x)|$



x	y
-2	0
-1	1
0	0
1	-2
2	0

x	y
-2	0
-1	-2
0	0
1	1
2	0

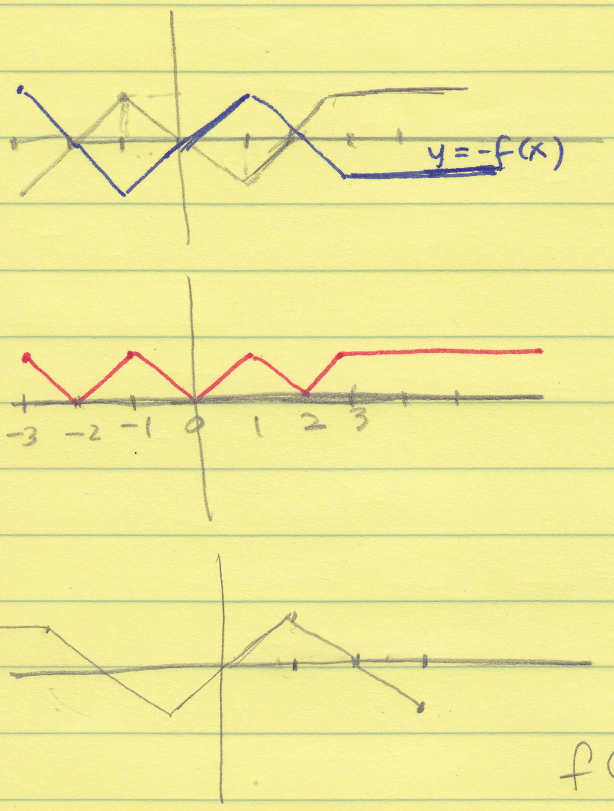


opposite x values

$y = f(-x)$

#122 chgx

p136 1



x	f(x)	−f(x)	|f(x)|	f(−x)
−3	−1	1	1	(3, −1)
−2	0	0	0	(2, 0)
−1	1	−1	1	(1, 1)
0	0	0	0	(0, 0)
1	−1	1	1	(−1, −1)
2	0	0	0	(−2, 0)
3	1	−1	1	(−3, 1)
4	1	−1	1	(−4, 1)
5	1	−1	1	(−5, 1)

$f(-x) \rightarrow$ opposite x

$-f(x) \rightarrow$ opposite y ($f(x)$)

15 $y^2 - xy = 2$

* x-axis : $y \rightarrow (-y) \rightarrow (-y)^2 - x(-y) = 2$

  $y^2 + xy = 2 \rightarrow$ not the same as the original

* y-axis : $x \rightarrow -x \rightarrow y^2 - (-x)(y) = 2$

  $y^2 + xy = 2 \rightarrow$ not the same as the original

* $y = x \rightarrow$ switch x & y : $x^2 - (y)(x) = 2 \rightarrow x^2 - xy = 2$

  not the same as the original

* origin $\rightarrow x \rightarrow -x$; $y \rightarrow -y$:

  $(-y)^2 - (-x)(-y) = 2 \rightarrow y^2 - xy = 2$; same as original ✓

15b. original: $x^2+y^2=1$

x-axis: $y \to -y$: $x^2+(-y)^2=1 \to x^2+y^2=1$ same ✓

y-axis: $x \to -x$: $(-x)^2+y^2=1 \to x^2+y^2=1$ same ✓

$y=x$: switch x & y: $y^2+x^2=1 \to x^2+y^2=1$ same ✓

origin: $x \to -x$; $y \to -y$: $(-x)^2+(-y)^2=1$

$x^2+y^2=1 \to$ same ✓

15c. $y = x|x|$ (original)

x-axis: $y \to -y$: $-y = x|x| \to y = -x|x|$ not the same

y-axis: $x \to -x$: $y = -x|-x| \to y = -x|x|$ not the same

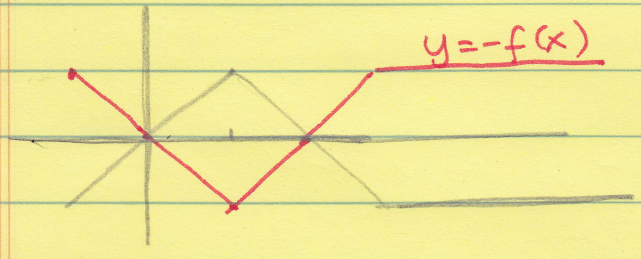
$y=x$: switch x & y: $x = y|y| \to$ not the same

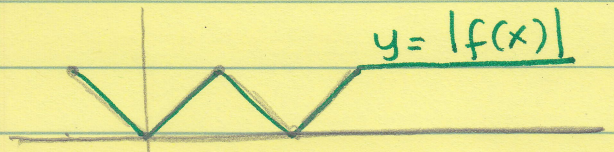
origin: $x \to -x$; $y \to -y$: $-y = -x|-x|$

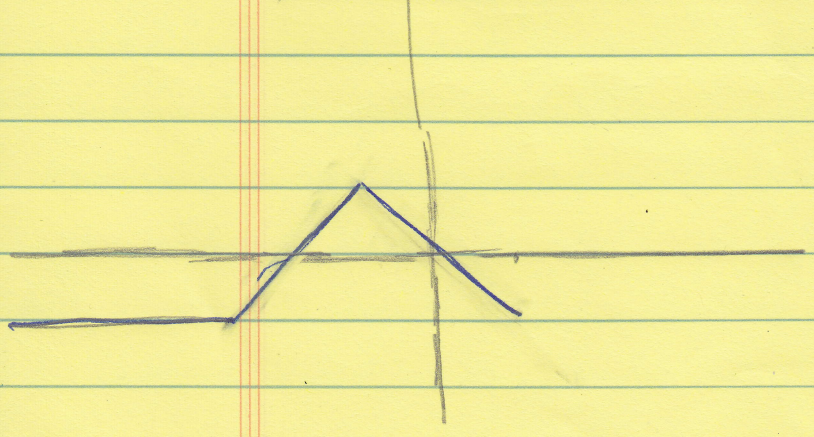
$y = x|x| \to$ same as original ✓

p135 CE

1.







x	y	opp y: $-f(x)$	$\lvert y\rvert$: $\lvert f(x)\rvert$	opp x: $f(-x)$
−1	−1	1	1	(1, −1)
0	0	0	0	(0, 0)
1	1	−1	1	(−1, 1)
2	0	0	0	(−2, 0)
3	−1	1	1	(−3, −1)
4	−1	1	1	(−4, −1)

p 130 #35

$f(x) = x^2$ $\quad g(x) = \sqrt{1-x}$

$f(g(x)) = f(\sqrt{1-x}) \rightarrow D: 1-x \geq 0 \rightarrow \boxed{x \leq 1}$

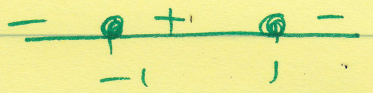
$= (\sqrt{1-x})^2 = 1-x \rightarrow D:$ all real #s

Final domain: $x \leq 1$

$g(f(x)) = g(x^2) \rightarrow D:$ all real #s

$= \sqrt{1-x^2} \rightarrow D: 1-x^2 \geq 0$

$(1+x)(1-x) \geq 0$



2: + − → −

0: + + → +

−2: − + → −

$-1 \leq x \leq 1$

Final domain: $-1 \leq x \leq 1$