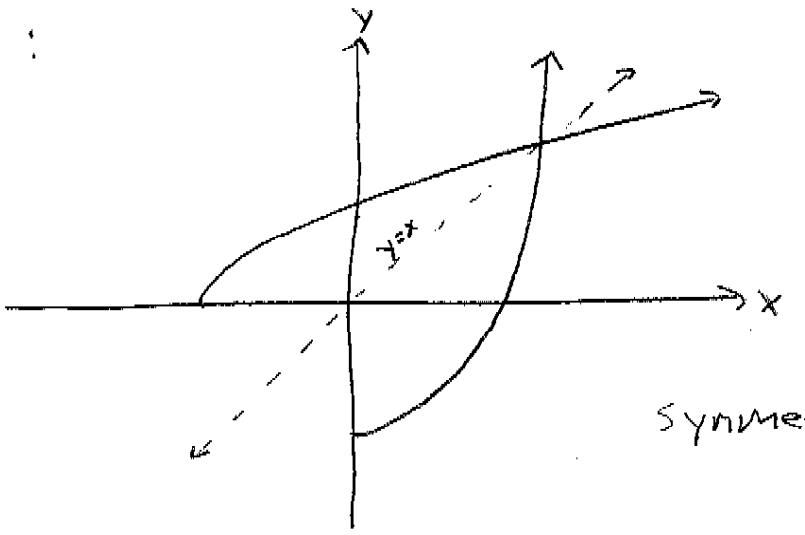
2.6a
1/3

What features do $f(x) = \sqrt{x+2}$ and $g(x) = x^2 - 2, x \geq 0$ share?

D_f: $\{x \mid x \geq -2\}$ $\quad$ D_g: $\{x \mid x \geq 0\}$

R_f: $\{y \mid y \geq 0\}$ $\quad$ R_g: $\{y \mid y \geq -2\}$

Graphs:



symmetric about $y = x$

x	-2	-1	2	7	14
f(x)	0	1	2	3	4
g(f(x))	-2	-1	2	7	14

Do composition $g(f(x)) = g(\sqrt{x+2})$

in small groups $f(g(x)) = f(x^2 - 2, x \geq 0)$

} graph on calculator.

Functions w/these characteristics are Inverses.

2.4a
4/3

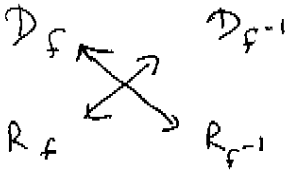
Characteristics of Inverse functions.

1) Notation: If f & g are inverse functions,

then $g = f^{-1}$ (f inverse)
$f = g^{-1}$ (g inverse)

$f^{-1} \neq \frac{1}{f}$ (see example)

2) Domain and Range:



3) Graphs:

symmetric about $y = x$.

- intercepts swapped.
- cross on the line.

4) Composition.

$$f^{-1}(f(x)) = x \quad , \quad x \in D_f$$

$$f(f^{-1}(x)) = x \quad , \quad x \in D_{f^{-1}}$$

SEE NEXT PAGE.

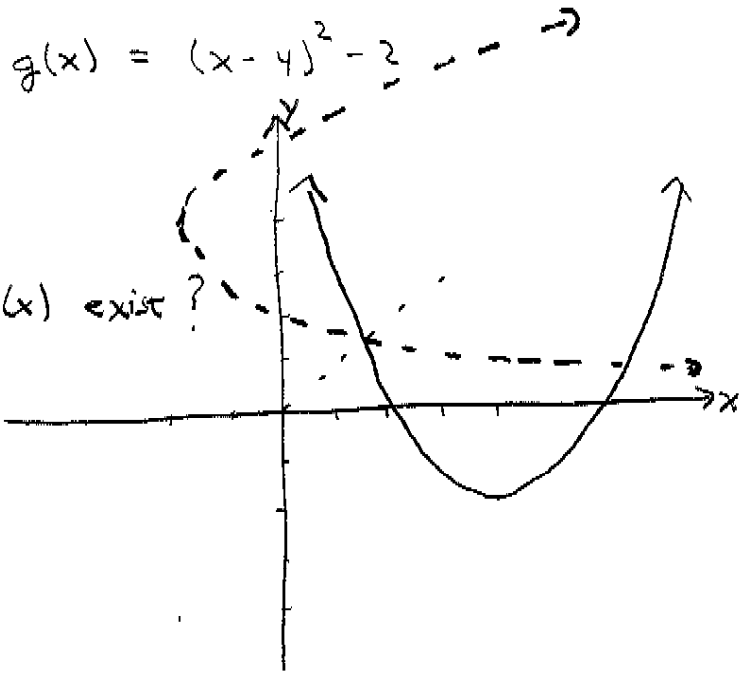
5) Horizontal Line Test

A function is invertible if it passes the horizontal Line Test. This means it is "ONE-TO-ONE."

2.6a
3/3

Question: Does the inverse always exist?

Let $g(x) = (x-4)^2 - 2$



Does $g^{-1}(x)$ exist?

but our "$g^{-1}(x)$" is not a function, since it doesn't pass the vertical line test.

Question: What is the relationship between points on f & points on f^{-1}?

x	0	1	2	3	4
$g(x)$	-2	-1	2	7	14
$f(g(x))$	0	1	2	3	4

points on f are (a,b), points on f^{-1} are (b,a).

2.6 b
1/1

Find the inverse.

$f(x) = \frac{1}{5}x$

$g(x) = 2x + 7$

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

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

$g(x) = 8x^3 - 5$

$h(x) = 2 + \sqrt{3-x}$

$f(x) = x^2 + 2x - 2, \quad x \leq -1$

Figure out $\sqrt[5]{\ }$ on calc.