Any questions?

Proficiency AA 3 Inverses
Where you become able to find the inverse of a function thru algebra, graphs, and tables.
You will be introduced to logarithms.

HW 6-7 to 6-15
HW 6-26 to 6-37
HW 6-44 to 6-53

Another word for "inverse" is "undo".
"Undo" the function $f(x) = 3x - 6$

or

Give the "inverse" of the function $f(x) = 3x - 6$.

or

Rewrite to solve for x

There are different methods.

6-4a

February 8, 2019

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

$f(x) = 3x - 6$

6-4a

$r(x) = x^3 - 5$

6-4b

$h(x) = 2(x + 3)^3$

6-4c

$$p(x) = \frac{10(x - 4)}{3}$$

6-4d

$f(x) = \frac{1}{2}x + 3$

6-16

$$g(x) = (2(3x + 1) - 5)^2$$

$f(x) = 5(x + 3)^2 - 2$

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

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

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

$$m(x) = \frac{-3}{x+2} + 5$$

HW 6-7 to 6-15

February 8, 2019

Numerically verifying

Numerically verify

$f(x) = 3x - 6$

$$f^{-1}(x) = \frac{x+6}{3}$$

6-4a

Numerically verify

$h(x) = 2(x + 3)^3$

$$h^{-1}(x) = \frac{\sqrt[3]{x-3}}{2}$$

6-4c

Find the inverse and numerically verify

$$g(x)=\frac{-2}{x-3}+4$$

Find $f^{-1}(x)$ and numerically verify

(tricky)

$$f(x) = \frac{3}{4}\left(\frac{2\sqrt{x+2}+6}{4} - 9\right)$$

Find $f^{-1}(x)$ and numerically verify

$$f(x) = (x+5)(x-2)$$

easy when you know how

Find $h^{-1}(x)$ and numerically verify

(hard)

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

Find $h^{-1}(x)$ and numerically verify

$$g(x) = \frac{x+3}{3-x}$$

(hard)

Find $f^{-1}(x)$ and numerically verify

$$f(x) = (x+1)(x-2)$$

Find $f^{-1}(x)$ and numerically verify

$$f(x) = x^2 - x - 2$$

Find $f^{-1}(x)$ and numerically verify

$$f(x) = 2(x+3)(x-5)$$

Find $n^{-1}(x)$ and numerically verify

$n(x) = (x+4)(x-4)$

$m(x) = (x+3)(x+3)$

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

$$f(x) = x^2 + 3x + 2$$

You may want to try these web sites out.

This one will find the inverse of a function:

https://www.symbolab.com/solver/function-inverse-calculator

HW 6-26 to 6-37

Find the inverse + numerically verify.

$f(x) = 3(x+2)^2 - 1$

$g(x) = \frac{1}{2}(x-5)^3 + 4$

$h(x) = 3x^2 + 12x + 11$

$$f(x) = \frac{1}{5}(x-2)+6$$

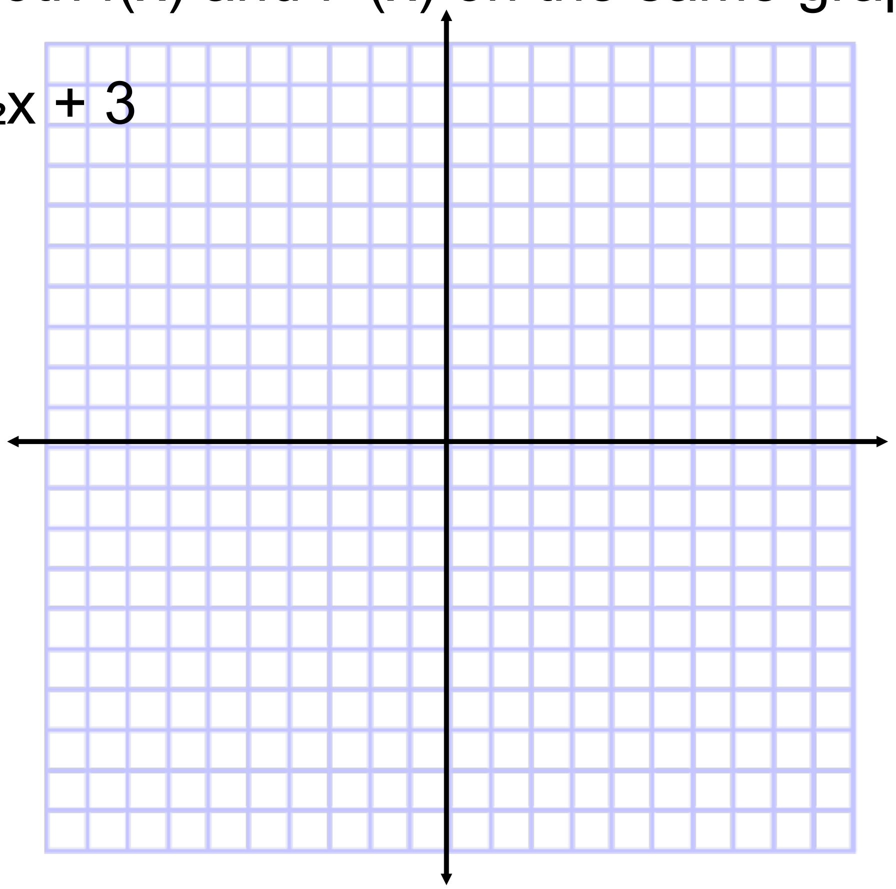
$$h(x) = \frac{2}{x-3}+2$$

$$j(x) = \frac{(x+2)}{(x-2)}$$

Graphing Inverses

Graph both f(x) and $f^{-1}(x)$ on the same graph.

$f(x) = \frac{1}{2}x + 3$



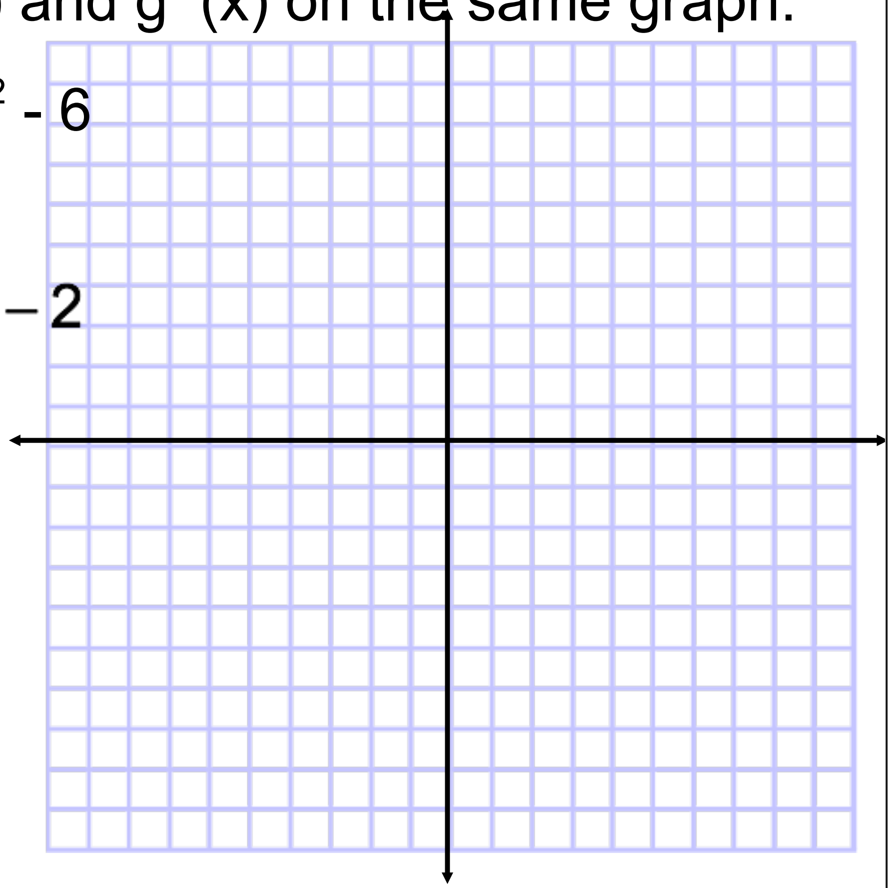
$g(x) = 3(x + 2)^2 - 6$ $g^{-1}(x) =$

6-16

Graph both g(x) and $g^{-1}(x)$ on the same graph.

$g(x) = 3(x + 2)^2 - 6$

$$g^{-1}(x) = \sqrt{\frac{x+6}{3}} - 2$$



Is there a pattern?

Can you see an easier way to do this?

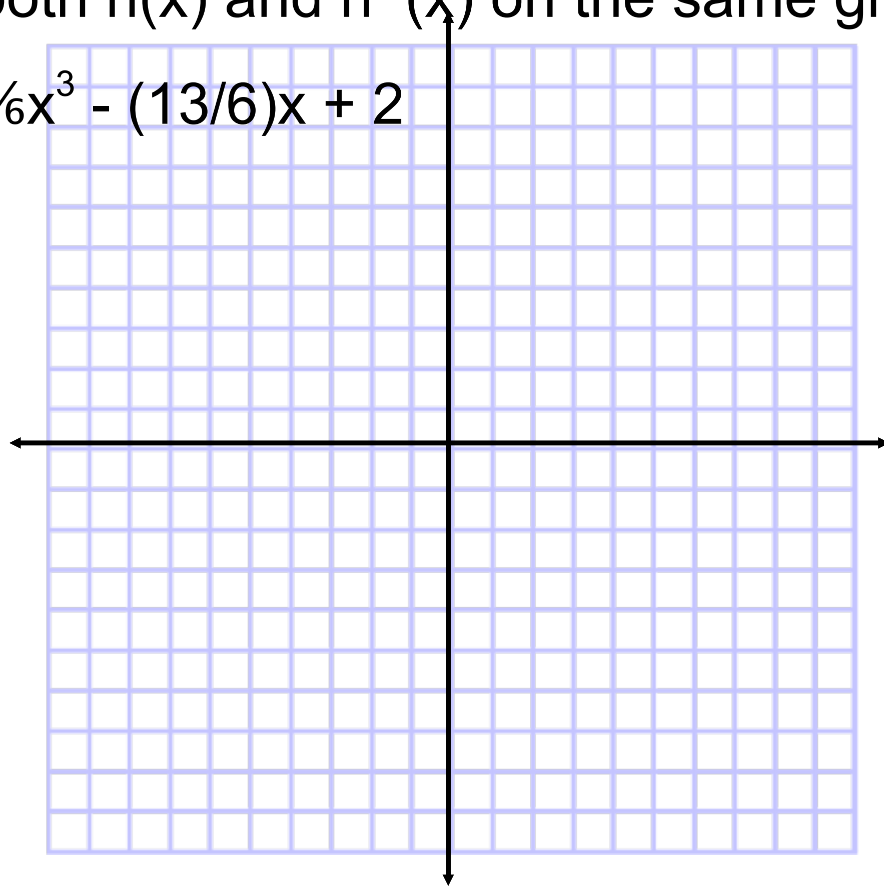
$h(x) = \frac{1}{6}x^3 - (13/6)x + 2 \quad h^{-1}(x) =$

Hint: use your table and plot points!

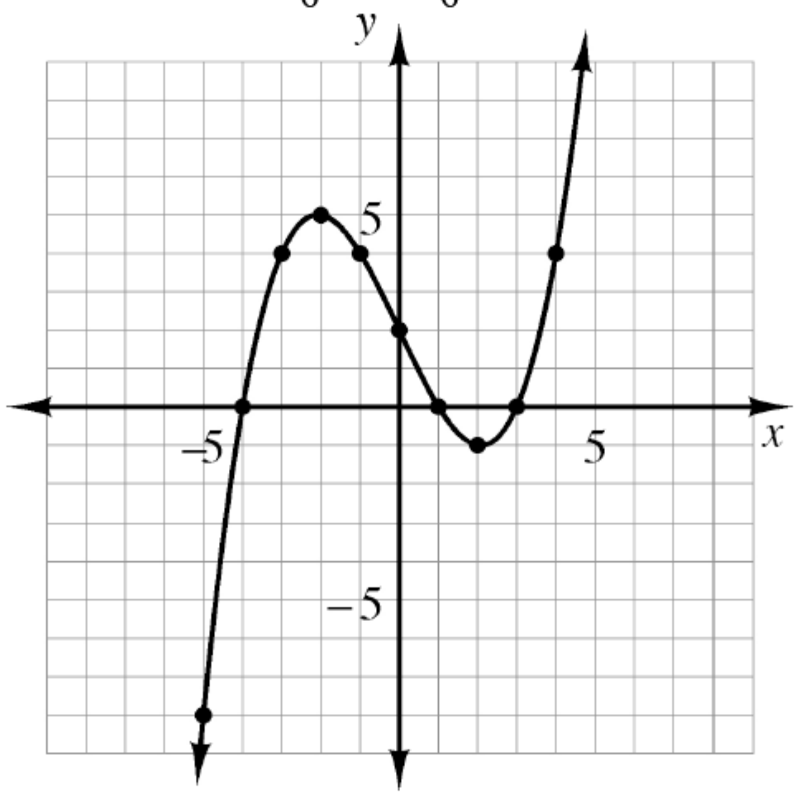
6-16

Graph both $h(x)$ and $h^{-1}(x)$ on the same graph.

$$h(x) = \frac{1}{6}x^3 - (13/6)x + 2$$



$$y = \frac{1}{6}x^3 - \frac{13}{6}x + 2$$



HW 6-26 to 6-37

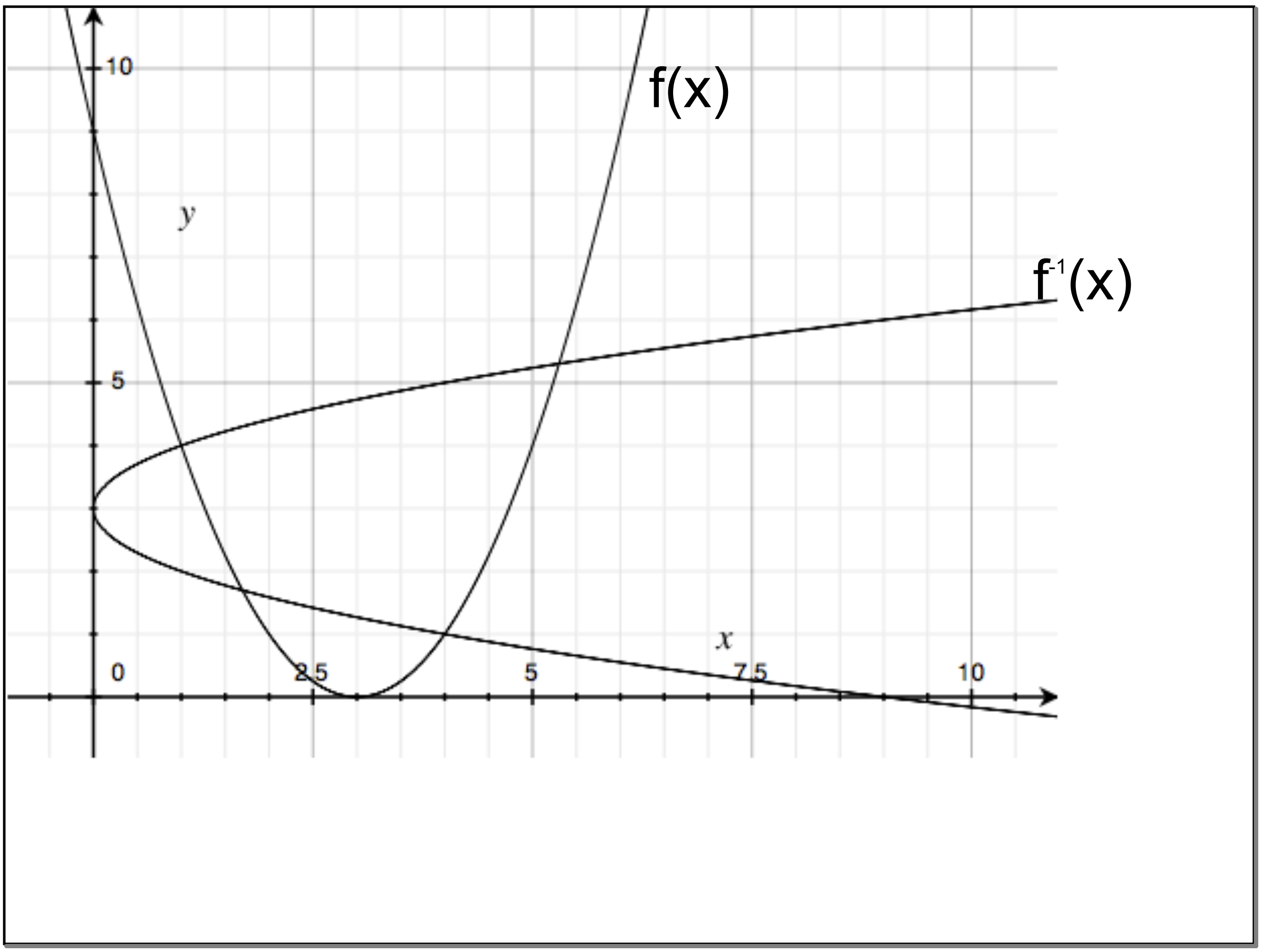
Find the inverse of $f(x) = (x - 3)^2$

Graph them both.

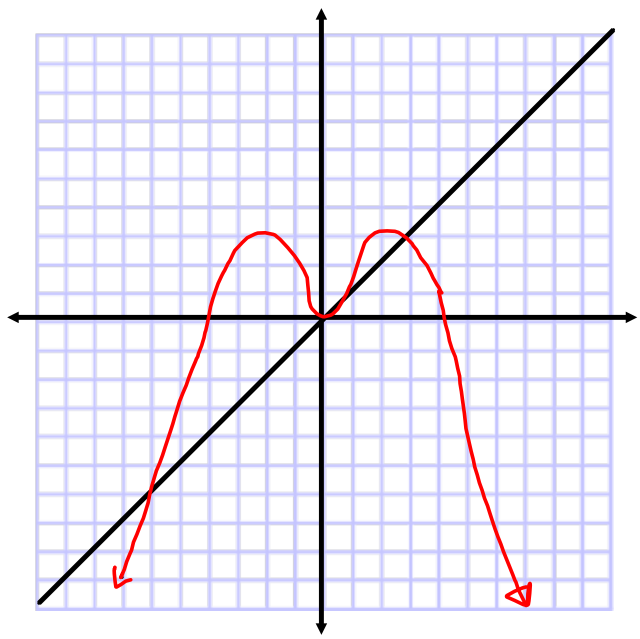
Give Domain and Range of both.

Are they functions?

Is there a way to make them functions?

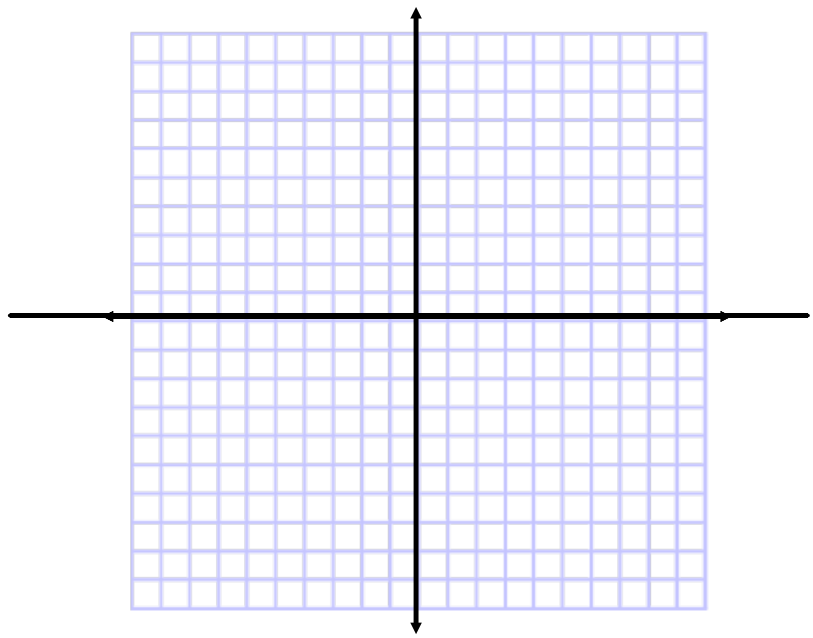


10
5
0
2.5
5
7.5
10
y
x
f(x)
$f^{-1}(x)$



How do you tell graphically if a relation is a function?

Is there a way to tell graphically if a relation's inverse is a function?



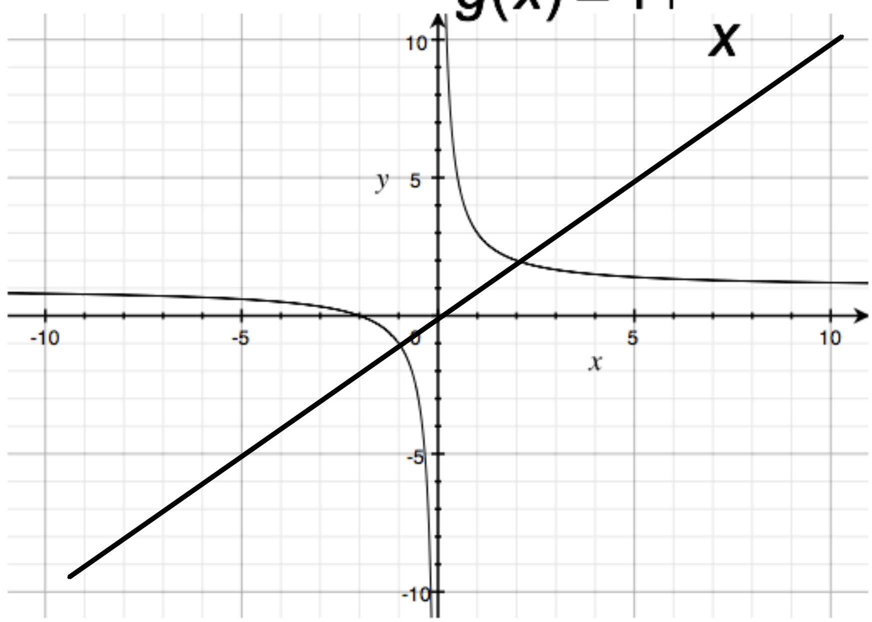
Can you name other functions whose inverses are not functions?

If a parent graph's inverse is a function will all graphs of that family be functions?

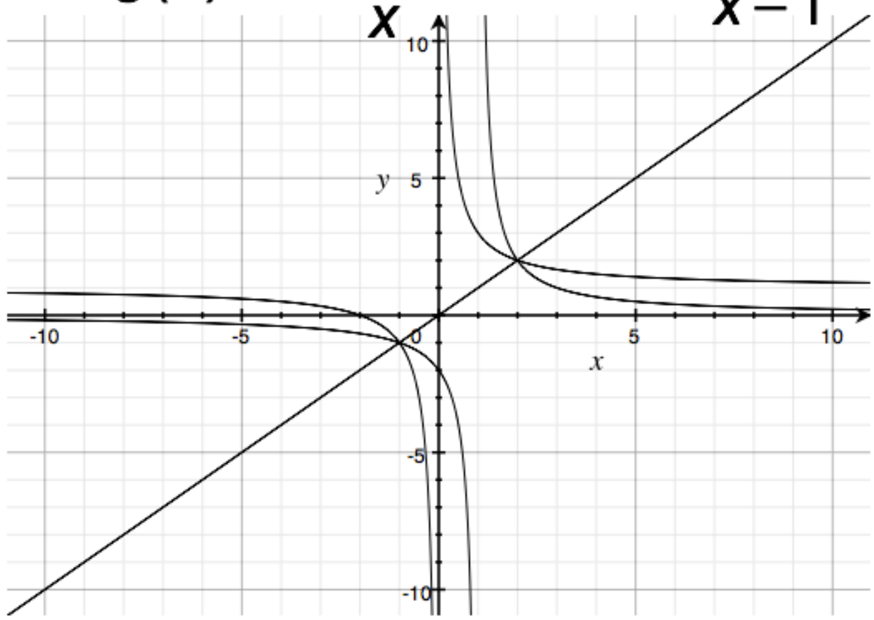
Sketch the graph $g(x) = \frac{2}{x} + 1$

Find and sketch $g^{-1}(x)$

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

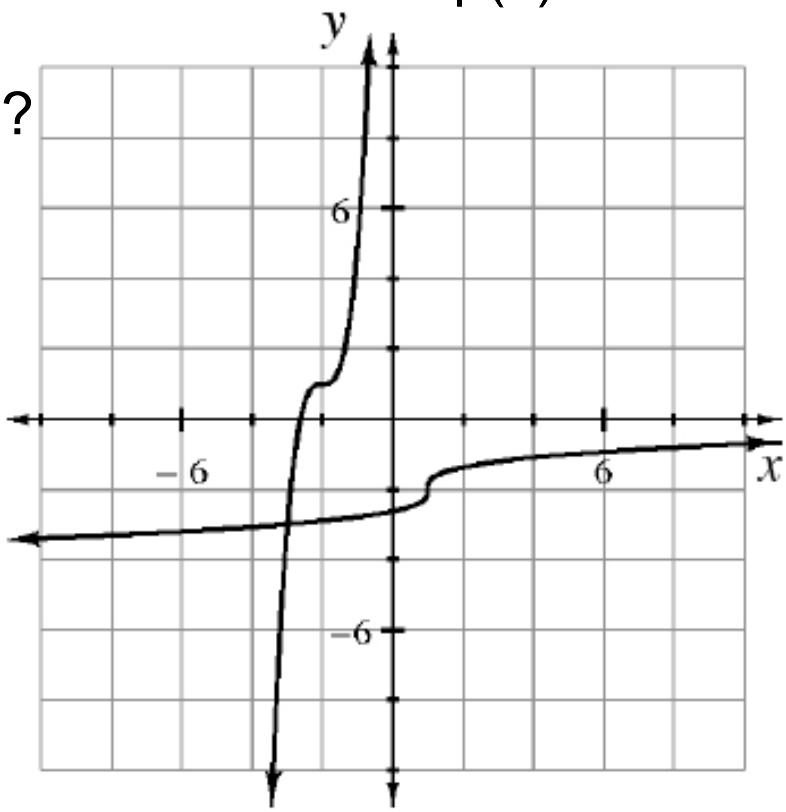


$$g(x) = 1 + \frac{2}{x} \qquad g^{-1}(x) = \frac{2}{x-1}$$



6-25

This is the graph of the function p(x) and it's inverse $p^{-1}(x)$.
Which is which?



HW 6-44 to 6-53

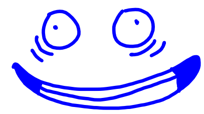
6-39

Find the inverse relation of $y = 2(x - 1)^3$

How can you test algebraically if you are correct?

Using the relation: $f(x) = \sqrt{(x - 2)} + 3$

1. Predict whether or not its inverse is a function.
2. Algebraically find its inverse.
3. Algebraically prove you are correct.



AA3 1 of 3

1a. Algebraically find an inverse

1b. Numerically verify - using ≥ 3 values.

2a. Graphically find an inverse.

2b. Numerically verify - using ≥ 3 points.

3. Find Domain & Range

4. Test if $f(x)$ and $f^{-1}(x)$ are functions

5. Alter $f(x)$ to make $f^{-1}(x)$ a function.

6. Algebraically verify $f^{-1}(x)$ is inverse of $f(x)$.

6-39

Algebraically prove these pairs of relations are inverses.

a. $f(x) = \frac{3}{5}x - 15$

$g(x) = \frac{5}{3}x + 25$

b. $f(x) = \frac{2(x+6)}{3} + 10$

$g(x) = \frac{3}{2}x - 21$

c. $e(x) = \frac{(x-10)^2}{4}$

$d(x) = 4\sqrt{x} + 10$

6-39

Algebraically prove these pairs of relations are inverses.

$$f(x)=\frac{3}{5}x-15$$

$$g(x)=\frac{5}{3}x+25$$

6-39

Algebraically prove these pairs of relations are inverses.

$$f(x) = \frac{2(x+6)}{3} + 10$$

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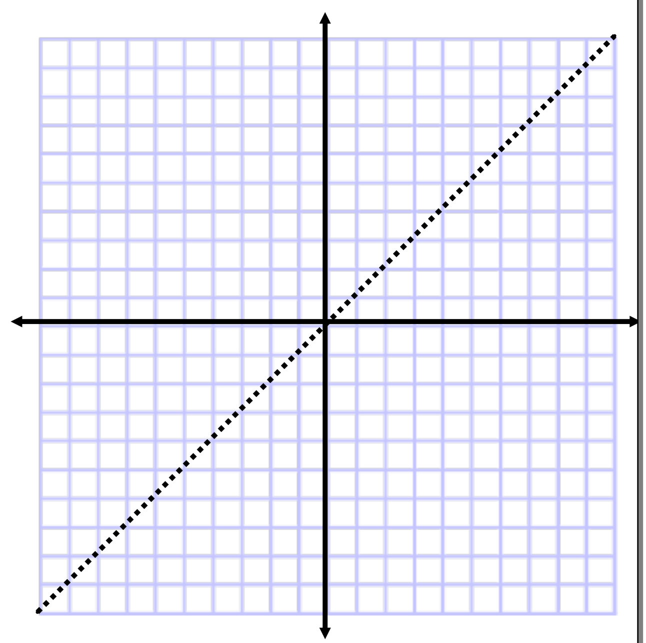
Algebraically prove these pairs of relations are inverses.

$$e(x) = \frac{(x-10)^2}{4}$$

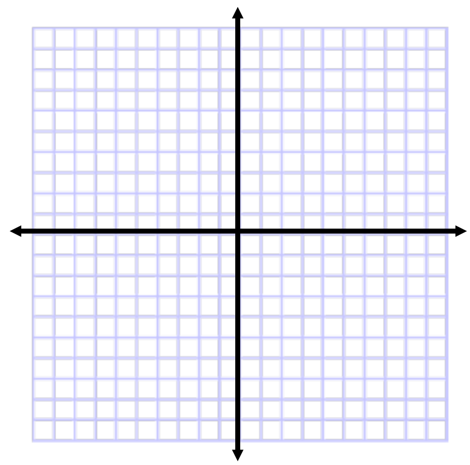
$$d(x) = 4\sqrt{x} + 10$$

$h(x) = 2(x + 3)^3$

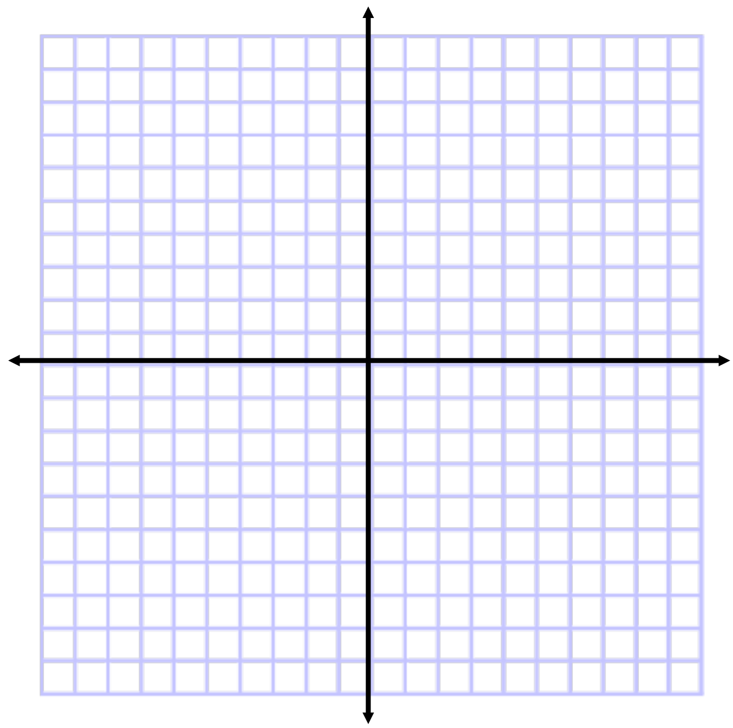


6-4c

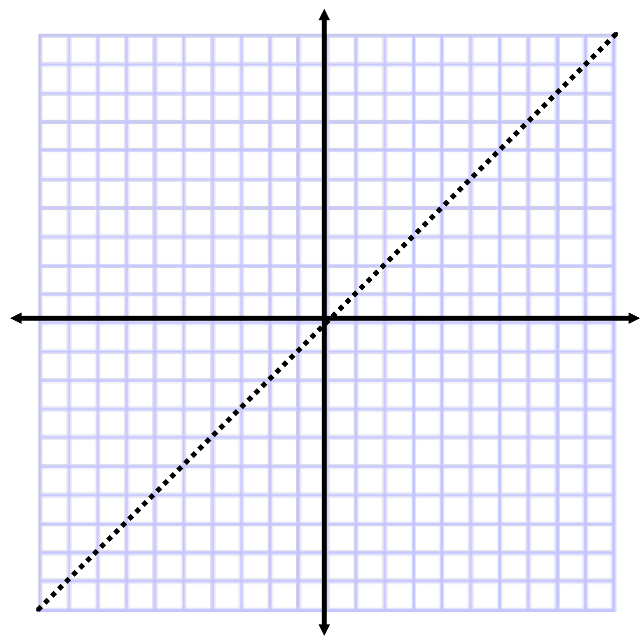
$f(x) = 5(x + 3)^2 - 2$



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



$$m(x)=\frac{-3}{x+2}+5$$



$$f(x) = \frac{x-3}{2x+4}$$

6-38

Consider the table at right.

x	y
1	–5
3	7
5	19
7	31

a. Write an equation for the relationship represented in the table.

b. Make a table for the inverse.

c. How are these two tables related to each other?

d. Use the relationship between the tables to find a shortcut for changing the equation of the original function into its inverse.

e. Now solve this new equation for y.

f. **Justify** that the equations are inverses of each other.

Can you find the inverse of these functions:

linear, quadratic, square root, cubic, hyperbola (reciprocal)

Can you verify numerically?

Can you graph an inverse?

Can you test for a function?

Can you test if the inverse is a function?

Can you state domain and range?

Can you "fix" a function so that its inverse is a function?


HA HA HA,
OH WOW

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