Algebra 1 4.7

Find the inverse of a relation

Find the inverse of a linear function

Quiz 4.5-4.6 Thurs.

relation

inverse does opposite thing $(x, y) \rightarrow (y, x)$

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

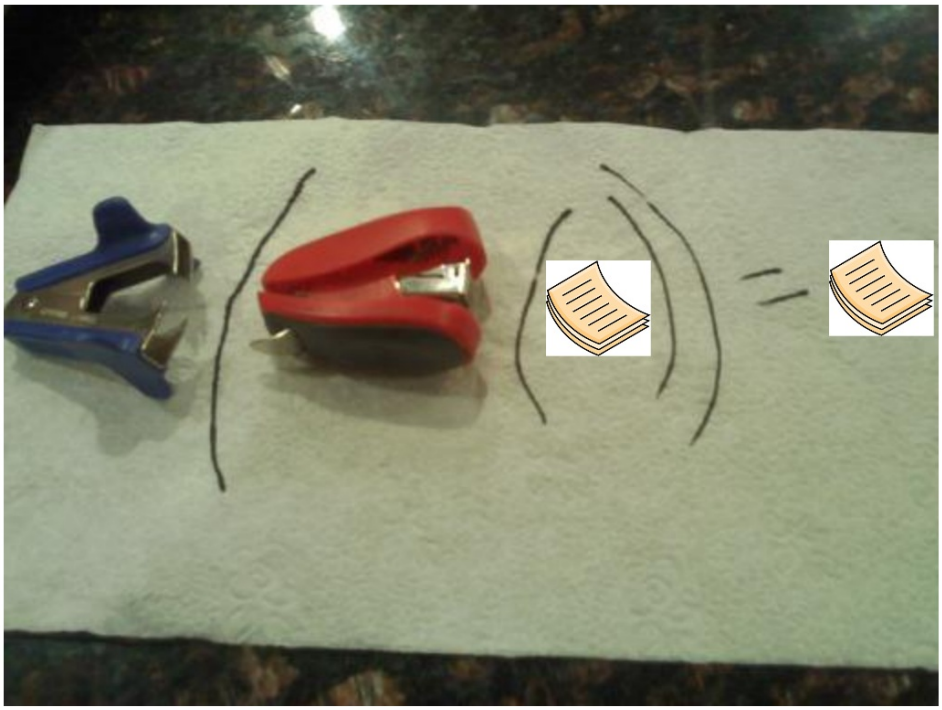
inverse function $f^{-1}(x)$

domain x

range y

whiteboards

cut&paste



They do the opposite thing.... like multiplying and dividing
...not alwys just the same as negative-positive...

KeyConcept Inverse Relations

Words If one relation contains the element (a, b), then the inverse relation will contain the element (b, a).

Example *A* and *B* are inverse relations.

A		*B*
$(-3, -16)$	→	$(-16, -3)$
$(-1, 4)$	→	$(4, -1)$
$(2, 14)$	→	$(14, 2)$
$(5, 32)$	→	$(32, 5)$



Example 1 Inverse Relations

Find the inverse of each relation.

a. $\{(4, -10), (7, -19), (-5, 17), (-3, 11)\}$

$f(x)$ $\quad \downarrow \quad \downarrow \quad \downarrow \quad \downarrow$

$f^{-1}(x)$ $(-10, 4)$ $(-19, 7)$ $(17, -5)$ $(11, -3)$

b.

x	−4	−1	5	9
y	−13	−8.5	0.5	6.5

$(-4,-13)$ $(-1,-8.5)$

x y

$(-13,-4)$ $(-8.5,-1)$

GuidedPractice

1A. $\{(-6, 8), (-15, 11), (9, 3), (0, 6)\}$

$f^{-1}(x)$

1B.

x	−10	−4	−3	0
y	5	11	12	15

$f^{-1}(x)$

y = x line of symm.

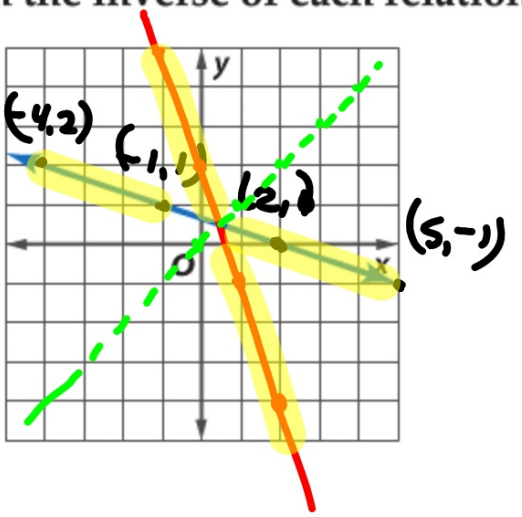
GuidedPractice y = 1x + 0

Exchange ordered pairs
(How can I get some from the graph?)

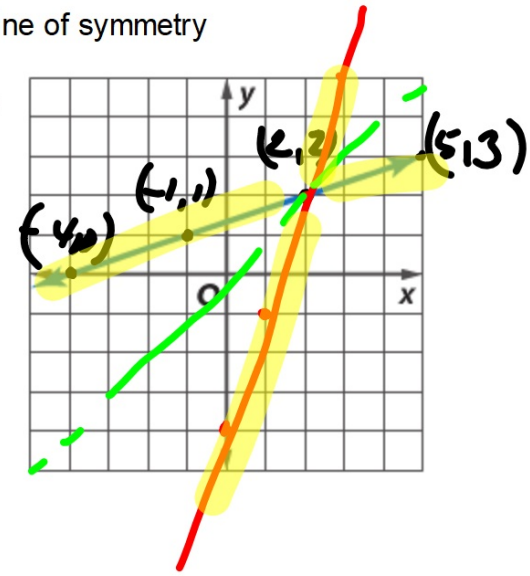
Graph the inverse of each relation.

Line of symmetry

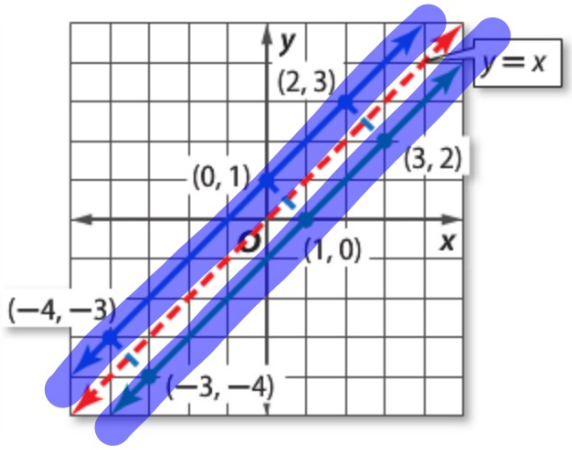
2A.



2B.



where is y=x?



inverse: reflection over y=x

Writing equations:
slope-intercept form function form

KeyConcept Finding Inverse Functions

To find the inverse function $f^{-1}(x)$ of the linear function $f(x)$, complete the following steps.

Step 1 Replace $f(x)$ with y in the equation for $f(x)$.

Step 2 Interchange y and x in the equation.

Step 3 Solve the equation for y.

Step 4 Replace y with $f^{-1}(x)$ in the new equation.

Remember: x and y trade places...
To consider: "What is happening to x? What would be the opposite thing?"
...so I should expect to see....

Example 3 Find Inverse Linear Functions

Find the inverse of each function.

a. $f(x) = 4x - 8$

b. $f(x) = -\frac{1}{2}x + 11$

GuidedPractice

3A. $f(x) = 4x - 12$

3B. $f(x) = \frac{1}{3}x + 7$