Algebra 1 4.7

Quiz 4.5-4.6 (Graphing calculators)

Find the inverse of a relation

Find the inverse of a linear function

relation

inverse

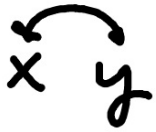
function

inverse function

domain

range

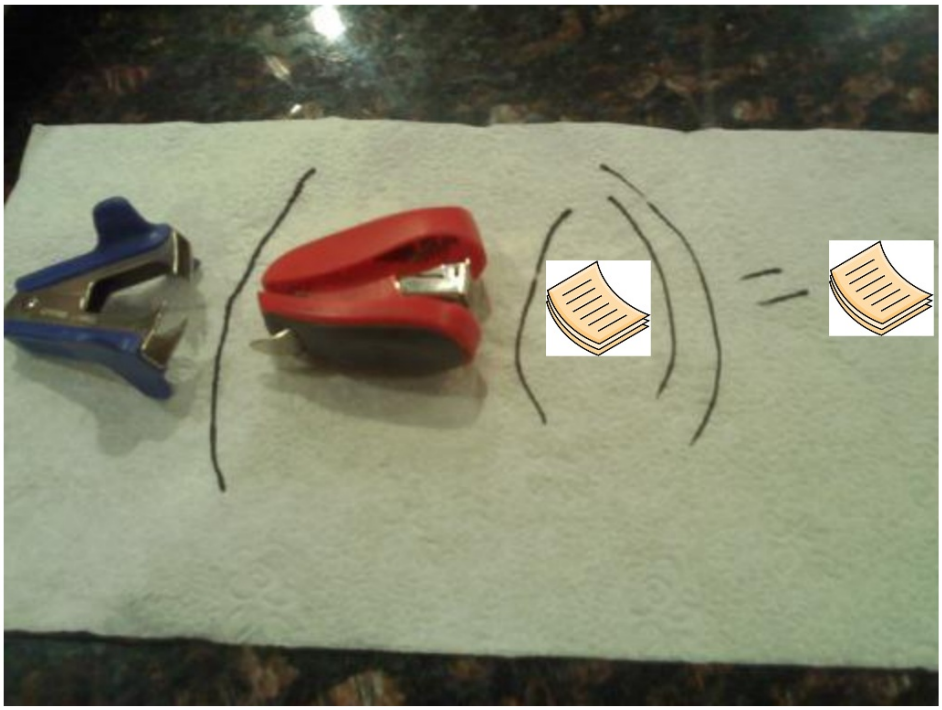
whiteboards




$(2,5) \rightarrow (5,2)$

$(-3,4) \rightarrow (4,-3)$

$y = 2x$ $\quad x = 2y$



They do the opposite thing.... like multiplying and dividing
...not the same as negative...

## 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)}

(−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) (5, 0.5) (9, 6.5)

## GuidedPractice

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

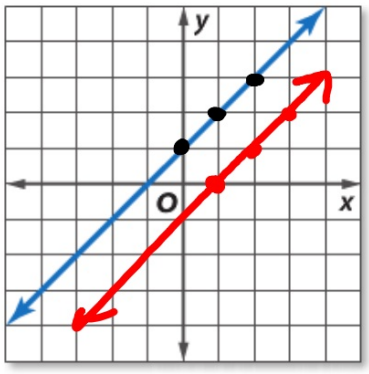
**1B.**

| $x$ | −10 | −4 | −3 | 0 |
|---|---|---|---|---|
| $y$ | 5 | 11 | 12 | 15 |

## Example 2 Graph Inverse Relations

**Graph the inverse of the relation.**

(0,1) (1,0)
(1,2) (2,1)
(2,3) (3,2)



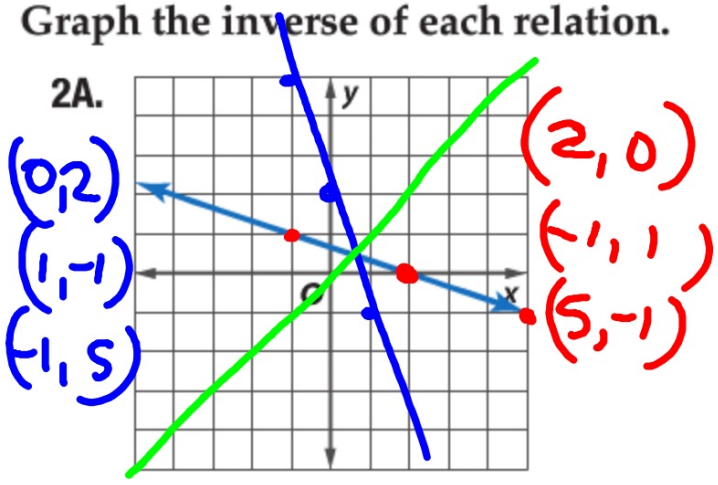

Exchange ordered pairs
How can I get some from the graph?

Line of symmetry

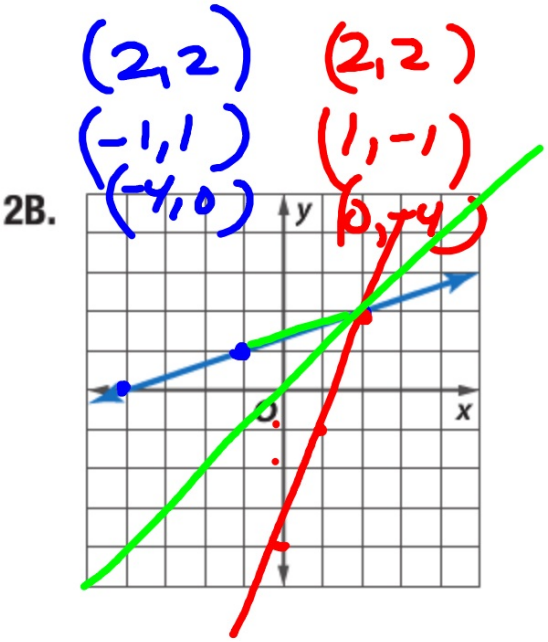
**GuidedPractice** $y=x$

**Graph the inverse of each relation.**

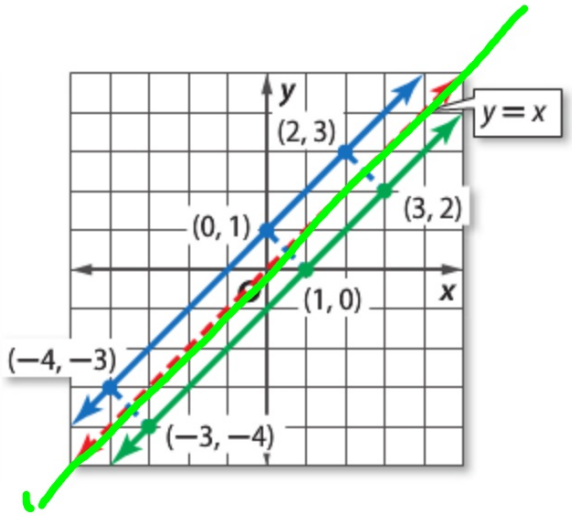
**2A.**




**2B.**




where is y=x?




inverse: reflection over y=x

Writing equations:
slope-intercept form function form

p. 267
1 - 4
8 - 13

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