

Journal Entry

Needs

anized!

o Now!

Glue/tape

1 slip of blank paper

1 highlighter or marker

journals

$$= 4x^2 - 1 \text{ and } g(x) = ($$

A). find  $f \circ g(x)$

B).  $g \circ f(x)$

C).  $f+g(x)$

D).  $f-g(4)$

### **1.7 SWBAT:**

1. Find inverse functions algebraically.
2. Verify that two functions are inverses of each other.
3. Determine if functions are one-to-one.

### **Why?**

Inverse functions can be helpful in further exploring how two variables relate to each other. For example, finding a correct European shoe size from the corresponding U.S. shoe size.

# 1.7 INVERSE FUNCTIONS

Objective: Students will be able to find the inverse of functions & relations

Definition: **Inverse Relation**

An ordered pair  $(a, b)$  is in a relation if and only if the ordered pair  $(b, a)$  is in the inverse relation.

Example: Let the set  $A = \{ (-1, 0), (7, 2), (4, -2) \}$

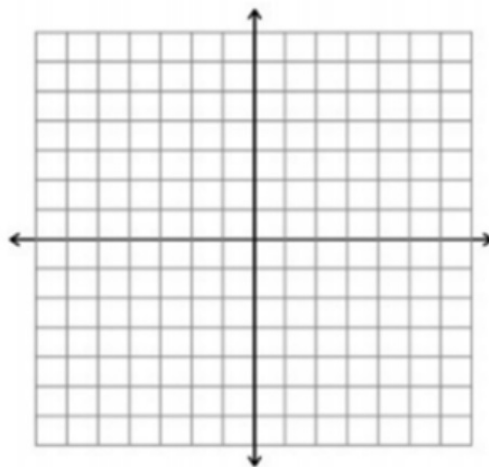
If set  $B$  is the inverse of set  $A$ , then  $B =$  \_\_\_\_\_

Graphically: **Inverse**

A function and its inverse are reflections of each other over the line  $y = x$ .

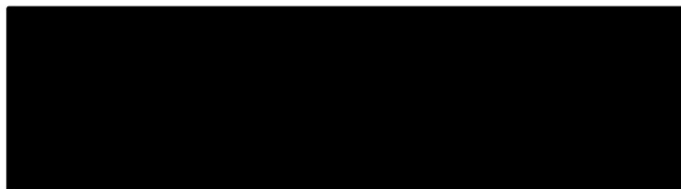
$y = x^2$

$x$	$y$



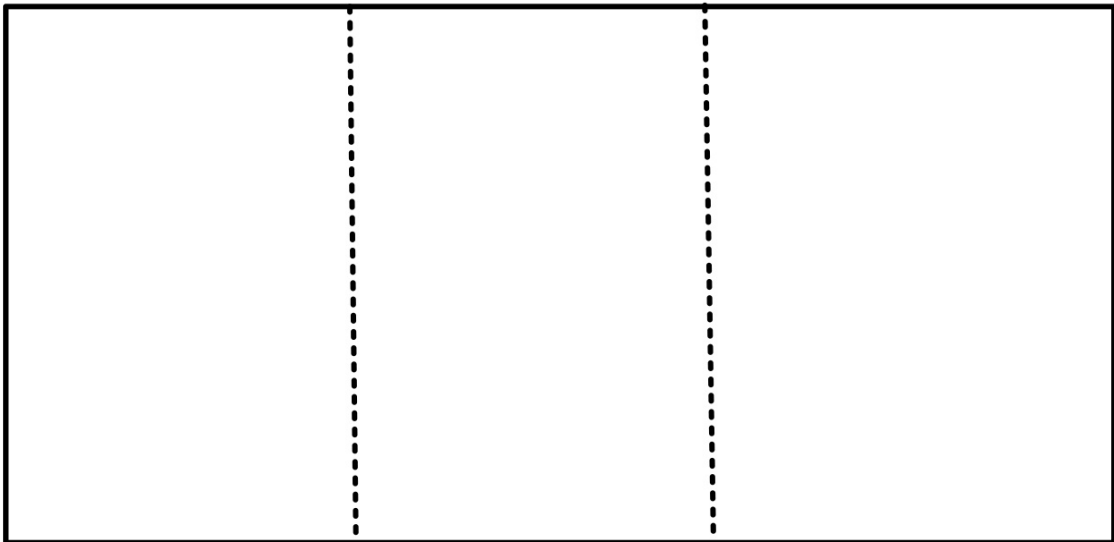
$x = y^2$

$x$	$y$



# The Flip & Find Method

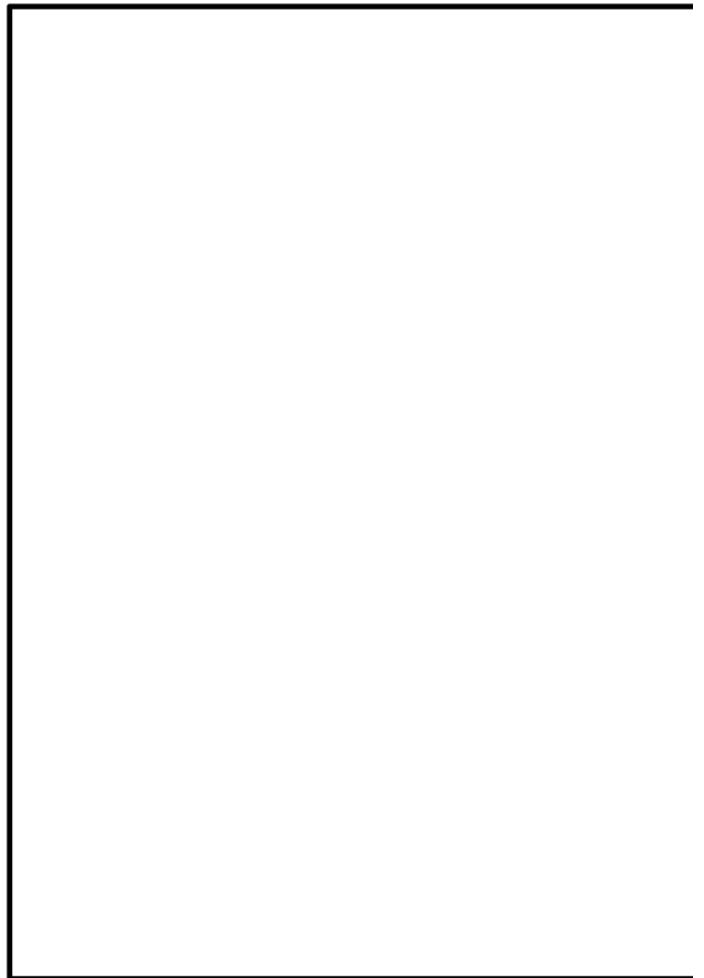
Ex 1: Find the inverse function of  $f(x) = 4x^2 + 1$



# **TRY IT!**

Find the inverse of:

2.  $f(x) = \frac{3x-2}{5}$



4: Are these functions inverses of each other?

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

$$g(x) = \sqrt[3]{\frac{x+1}{2}}$$

**TEAM TALK!**

Which of the functions below is the inverse function of

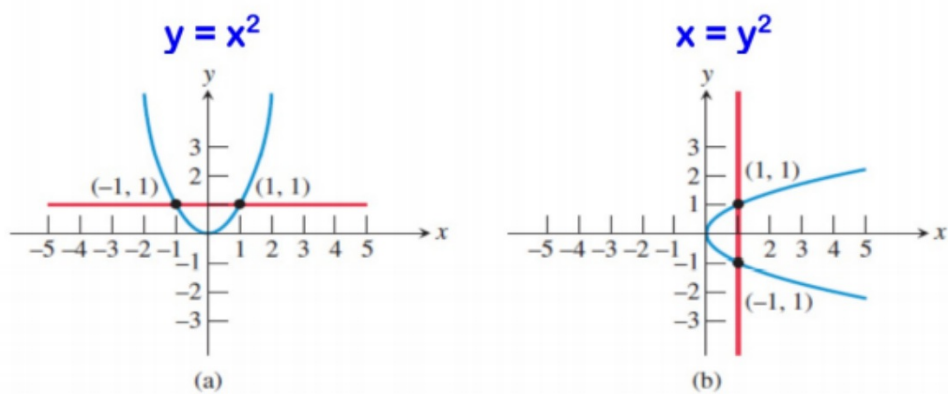
$$f(x) = \frac{5}{x-2}$$

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

A.

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

B.



**FIGURE 1.65** The inverse relation in (b) fails the vertical line test because the original relation in (a) fails the horizontal line test.

**Vertical Line Test:**

**Horizontal Line Test:**

**One to One:**



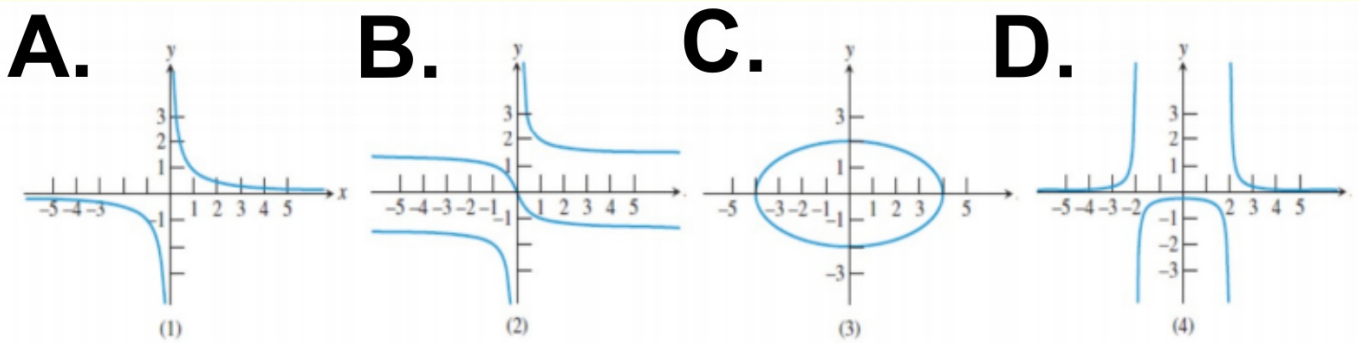


FIGURE 1.66 (Example 3)

Which of the graphs in Figure 1.66 (above) are graphs of

a) relations that are functions?

b) relations that have inverses that are functions?

## Summary of Function Tests

1. **Vertical Line Test** - determines whether the equation itself is a function
2. **Horizontal Line Test** - determines whether the inverse will be a function
3. **One-to-One** - If a graph passes both the Vertical & Horizontal Line Tests

## **P-I-G Practice!**

1. Complete the Practice
2. When finished...

- ORGANIZE YOUR BINDER AND JOURNAL
- CLEAN UP ALL MATERIALS

## Letter to a Celebrity

Imagine your favorite ~~celebrity~~<sup>teacher</sup> or icon has taken some interest in your life at Garinger High School. Write a letter to your favorite celebrity, role model, or person you respect explaining the following topics. Make sure to include pictures and examples where needed.

- Explain how to find the inverse of a function
- Vertical Line Test
- Horizontal Line Test
- and finally, explain what "one-to-one" means.

