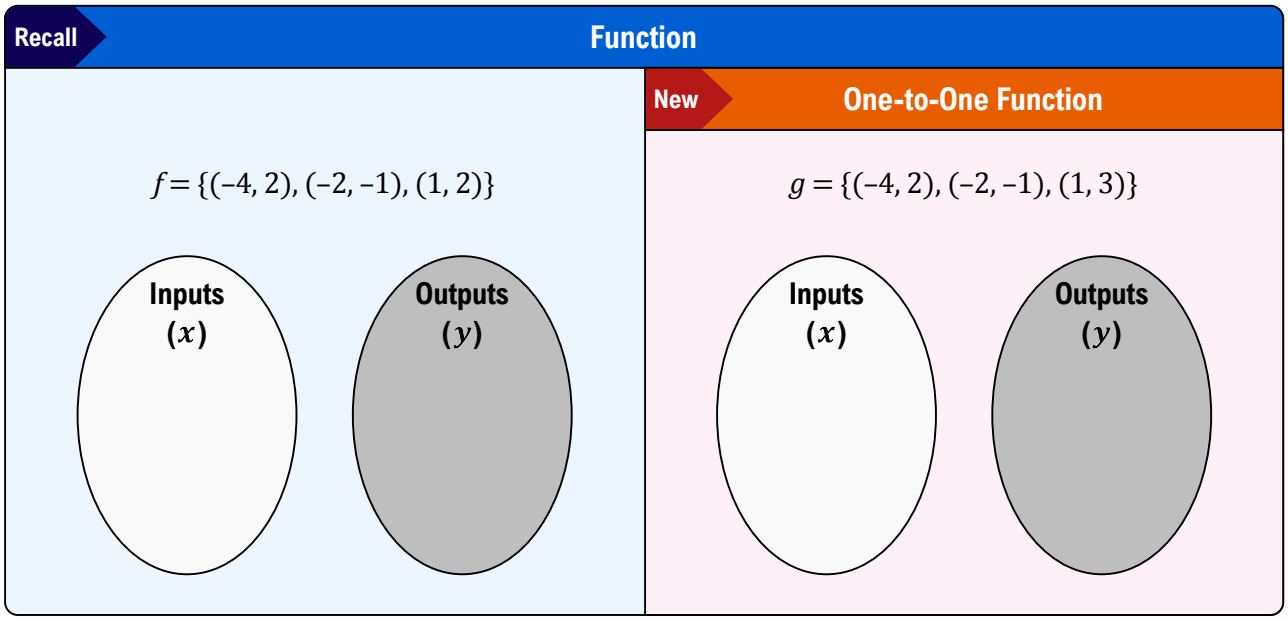
TOPIC: INTRODUCTION TO INVERSE FUNCTIONS

One-to-One Functions

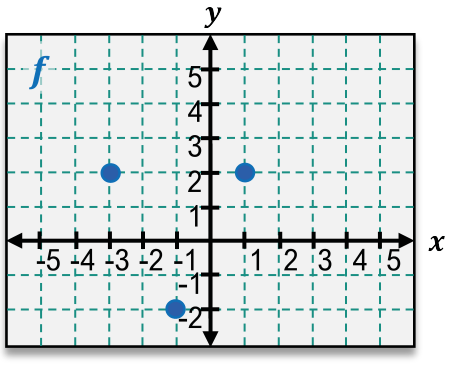
◆ Recall: A **function** is a relation where each input (x) is paired with at most 1 output (y).

► For a **one-to-one function**, each _____ (y) is paired with at most 1 _____ (x).



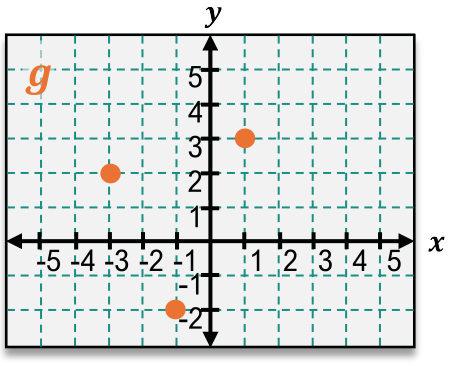
◆ Use the Horizontal Line Test (HLT) to determine if a function is **one-to-one**.

► If you can draw ***any*** horizontal line that passes through more than 1 point, the function _____ one-to-one.



Function (VLT)? ☐

One-to-one (HLT)? ☐



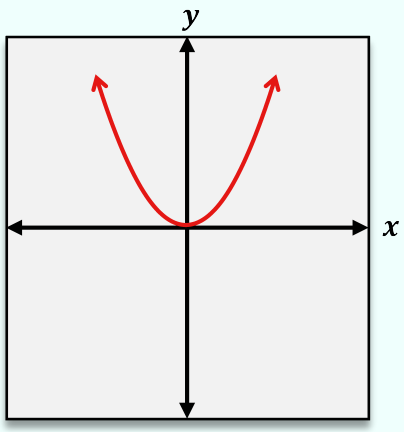
Function (VLT)? ☐

One-to-one (HLT)? ☐

TOPIC: INTRODUCTION TO INVERSE FUNCTIONS

EXAMPLE Determine if each of the following graphs is a one-to-one function.

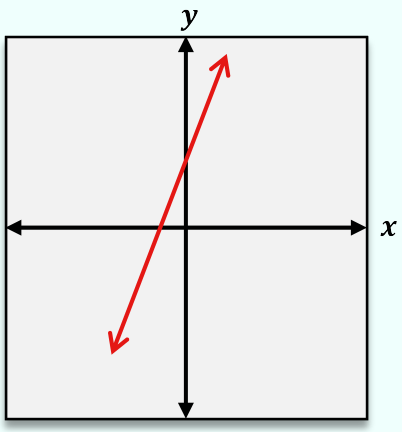
(A)



Function (VLT)? ☐

One-to-one (HLT)? ☐

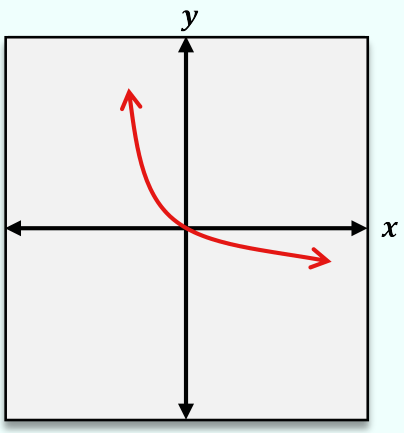
(B)



Function (VLT)? ☐

One-to-one (HLT)? ☐

(C)

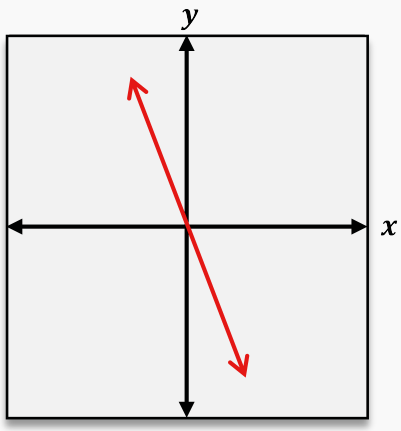


Function (VLT)? ☐

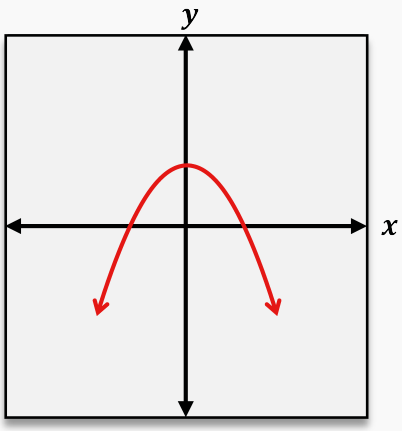
One-to-one (HLT)? ☐

PRACTICE Which of the following is the graph of a one-to-one function?

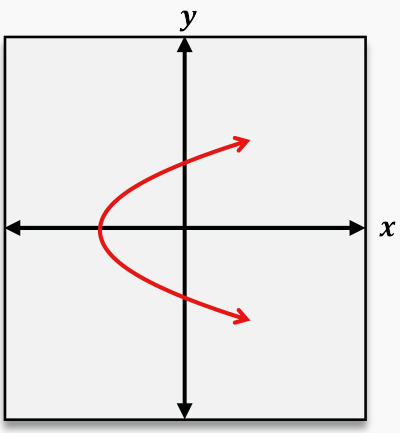
(A)



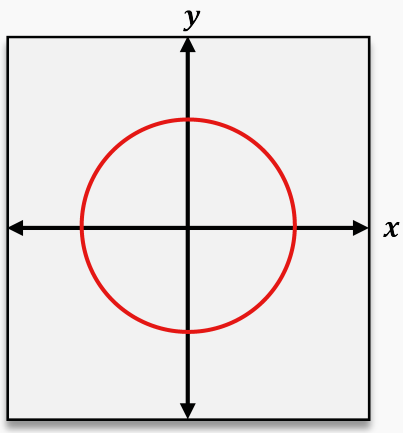
(B)



(C)



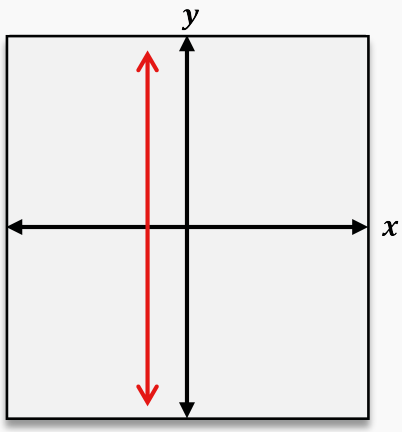
(D)



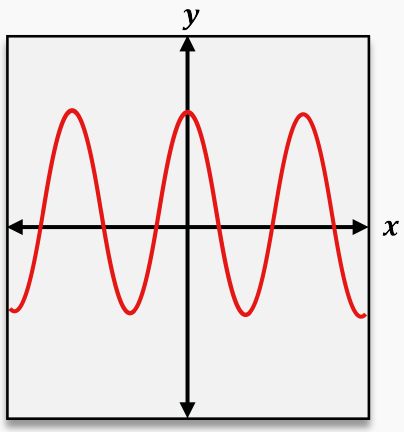
TOPIC: INTRODUCTION TO INVERSE FUNCTIONS

PRACTICE Which of the following is the graph of a one-to-one function?

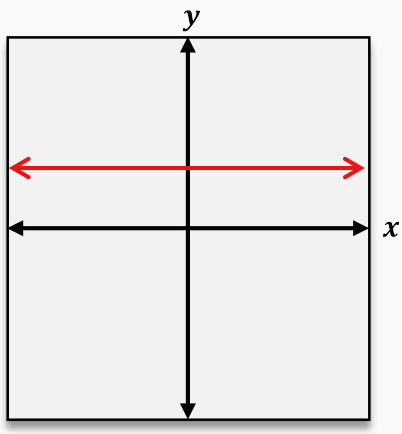
(A)



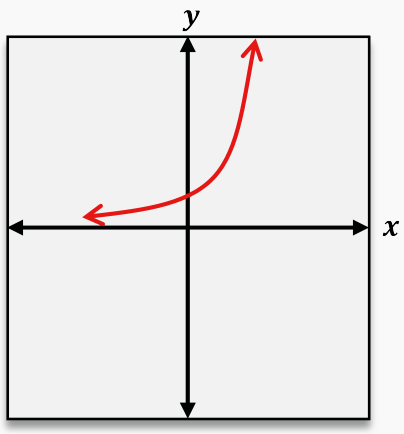
(B)



(C)



(D)



PRACTICE Consider the following relations. Which is a one-to-one function?

(A) $\{(1, 4), (2, 5), (3, 6), (4, 7)\}$

(B) $\{(1, 2), (1, 3), (2, 4)\}$

(C) $\{(2, 3), (3, 3), (4, 5)\}$

(D) $\{(1, 1), (2, 2), (3, 1), (9, 9)\}$

TOPIC: INTRODUCTION TO INVERSE FUNCTIONS

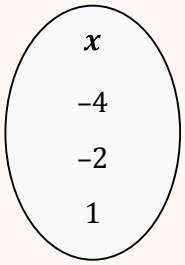
Intro to Inverse Functions

◆ If a **function** f is one-to-one with ordered pairs (x, y), it has an **inverse function** ____ with ordered pairs (__, __).

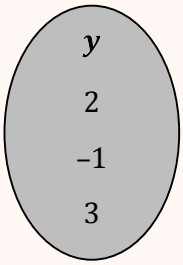
► Note: The -1 in f^{-1} is _____ an exponent. f^{-1} $\frac{1}{f}$.

New **Inverse Function**

[DOMAIN | RANGE] of f



[DOMAIN | RANGE] of f



$f = \{(-4, 2), (-2, -1), (1, 3)\}$

$f^{-1} =$ _____

[DOMAIN | RANGE] of f^{-1}

[DOMAIN | RANGE] of f^{-1}

TOPIC: INTRODUCTION TO INVERSE FUNCTIONS

EXAMPLE Consider the table of values. Answer the questions that follow.

(A)

x	$f(x)$
1	4
2	7
3	9
4	12

(A) Is it a function?
(B) Is it one-to-one?
(C) Find its inverse.

(B)

x	$g(x)$
1	8
2	10
3	10
4	15

(A) Is it a function?
(B) Is it one-to-one?
(C) Find its inverse.

PRACTICE Consider the set of ordered pairs. Verify if it is one-to-one. If so, find its inverse.

(A)

$$f = \{(2,9),(4,11),(6,15),(8,20)\}$$

(B)

$$g = \left\{\left(1,\frac{3}{2}\right),\left(4,\frac{5}{3}\right),\left(7,\frac{9}{4}\right),\left(10,\frac{11}{6}\right)\right\}$$