10-2 Inverses

Objective: I can find the inverse of a linear, quadratic, and cubic function.
Objective: I can show inverses graphically.
Objective: I can explain the identity function.

- **Vocab:** verify, inverse, cubic, cube root, square root, composition, parent function, one-to-one, horizontal line test

- F.BF.4
- F.BF.1
- F.IF.7

Have we done composition yet?

- Deinition of an inverse
- Find inverses
- Inverses graphically
- Identity function

Inverse of a Relation

The **inverse of a relation** consisting of the ordered pairs (x, y) is the set of all ordered pairs (y, x).

Find the inverse of each relation. State whether the relation is a function. State whether the inverse is a function.

a. {(5, 2), (4, 3), (3, 4), (2, 5)}

b. {(2, 1), (4, 2), (2, 3), (8, 4)}

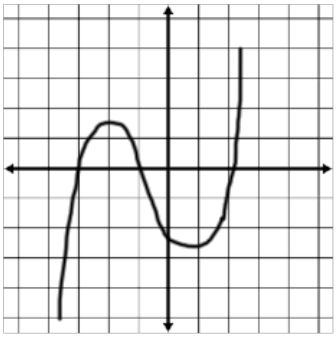
c. {(1, 2), (4, 3), (2, −1), (5, 3)}

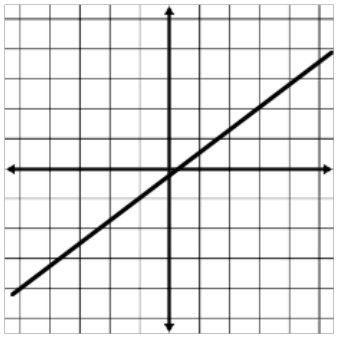
d. {(5, 2), (1, 5), (5, 4), (7, 2)}

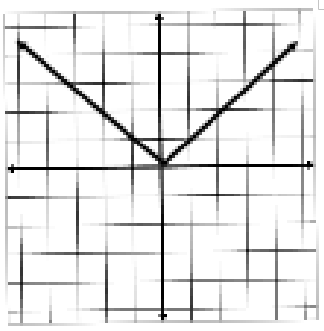
Horizontal-Line Test

The inverse of a function is a function if and only if every horizontal line intersects the graph of the given function (passed the vertical-line test) at no more than one point.

Determine whether the inverse of each function is also a function







To find the inverse equation of a function

1. Interchange x and y
2. Solve for y

For each function, find an equation for the inverse.

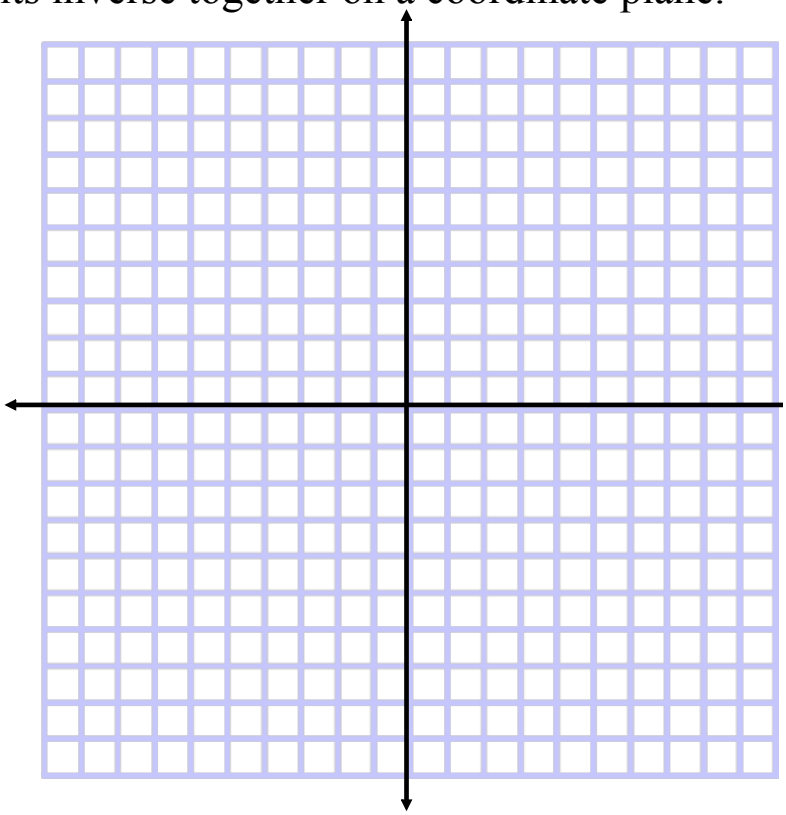
a. $f(x) = 5x + 1$

b. $f(x) = \dfrac{x - 1}{4}$

The graph of a function and its inverse is symmetrical with respect to the $y = x$ line.

Graph the function and its inverse together on a coordinate plane.

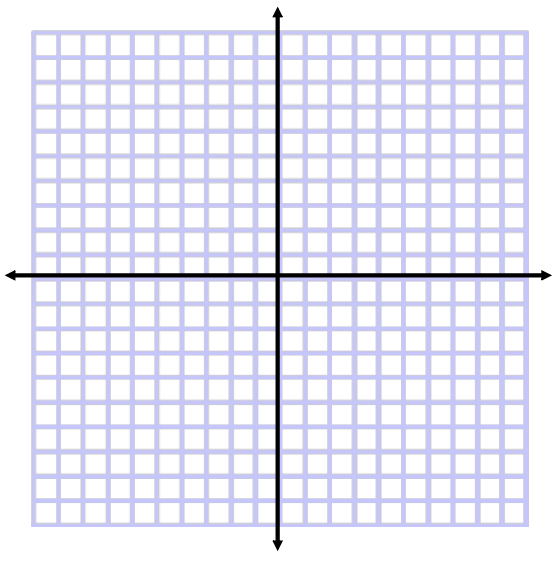
$f(x) = 3x + 6$

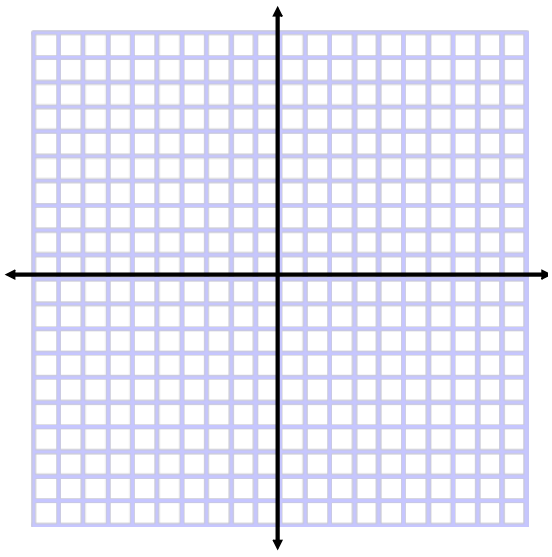


Find the inverse of the following functions. Then graph and see if the inverse is a function using the horizontal line test.

a. $y = x^2 + 3$

b. $f(x) = 2x^2 - 6$





Find the inverse of the following functions. Then graph and see if the inverse is a function using the horizontal line test.

a. $f(x) = x^3 - 6$

b. $g(x) = 3x^3 + 9$