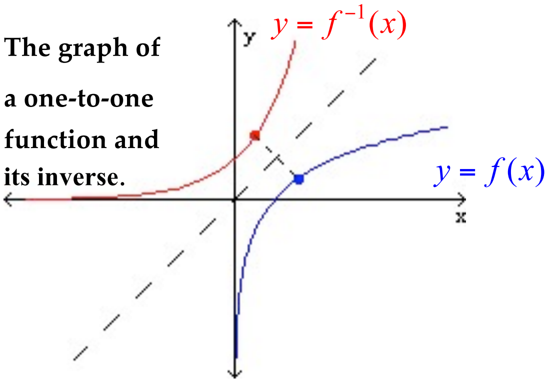
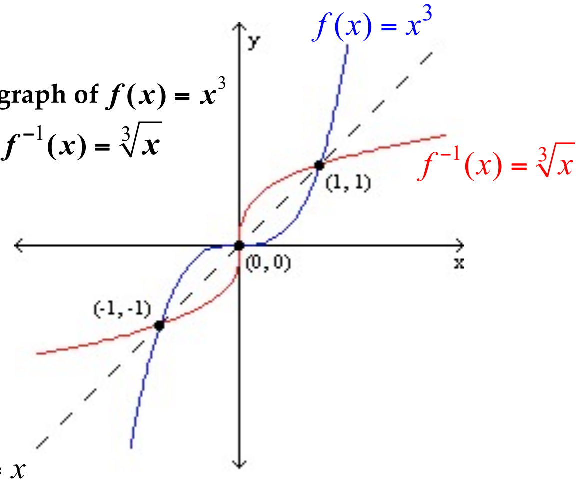
Objective 4: Sketching the Graphs of Inverse Functions

The graph of f^{-1} is a reflection of the graph of f about the line $y = x$.
If the functions have any points in common, they must lie along the line $y = x$.

The graph of a one-to-one function and its inverse.

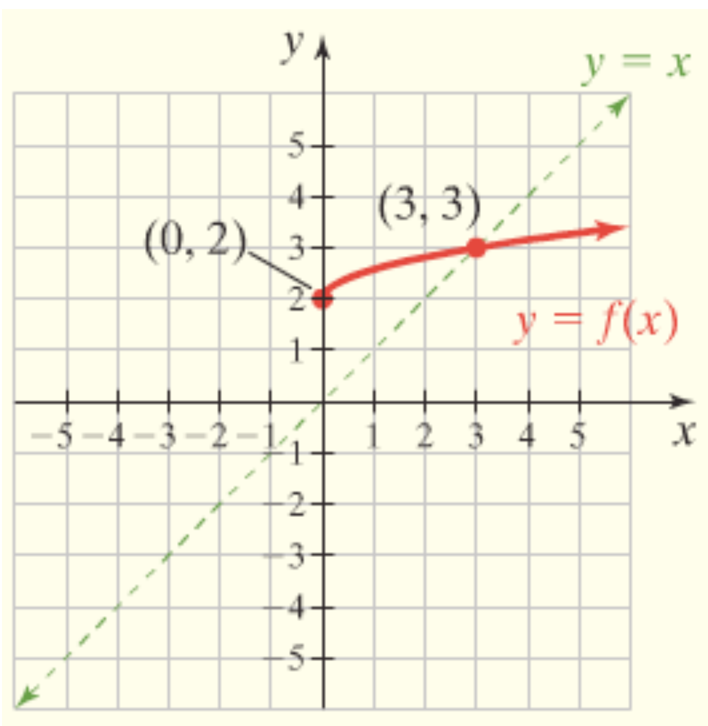


The graph of $f(x) = x^3$ and $f^{-1}(x) = \sqrt[3]{x}$



3.6.26

Sketch the graph of f^{-1} given the graph of f. Then state the domain and range of each using interval notation.



Domain of f	
Range of f	
Domain of f^{-1}	
Range of f^{-1}	

Objective 5: Finding the Inverse of a One-to-one Function

We know that if a point (x, y) is on the graph of a one-to-one function, then the point (y, x) is on the graph of its inverse function.

To find the inverse of a one-to-one function, replace $f(x)$ with *y*, interchange the variables x and y then solve for *y*. This is the function $f^{-1}(x)$.

3.6.34

Write an equation for the inverse function, and the state the domain and range of both given $f(x)$.

$f(x) = \sqrt[3]{2x-3}$

Domain of *f*	
Range of *f*	
Domain of f^{-1}	
Range of f^{-1}	

3.6.40

Write an equation for the inverse function, and the state the domain and range of both given $f(x)$.

$f(x) = \dfrac{8x-1}{7-5x}$

Domain of *f*	
Range of *f*	
Domain of f^{-1}	
Range of f^{-1}	

Inverse Function Summary

1. The inverse function f^{-1} exists if and only if the function f is one-to-one.
2. The domain of f is the same as the range of f^{-1} and the range of f is the same as the domain of f^{-1}.
3. To verify that two one-to-one functions f and g are inverses of each other, use the composition cancellation equations to show that $f(g(x)) = g(f(x)) = x$.
4. The graph of f^{-1} is a reflection of the graph of f about the line $y = x$. That is, for any point (a, b) that lies on the graph of *f*, the point (b, a) must lie on the graph of f^{-1}.
5. To find the inverse of a one-to-one function, replace $f(x)$ with *y*, interchange the variables x and y then solve for *y*. This is the function $f^{-1}(x)$.