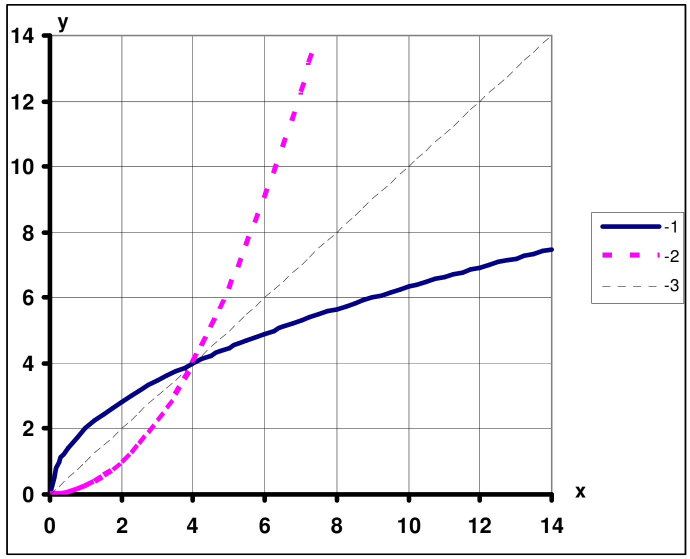
# An Easy Way to Find Rules for Inverse Functions

Consider the three functions whose graphs are shown to the right.




1) f(x): $y = 2\sqrt{x}$

2) g(x): $y = 0.25x^2$

3) h(x): $y = x$

Observe the following:

g(f(x)) = g( $2\sqrt{x}$ ) = $0.25(2\sqrt{x})^2$ = ________

f(g(x) = f(.25 $x^2$ ) = $2\sqrt{0.25x^2}$ = ________

So f and g are inverse functions. We sometimes denote the inverse of f by $f^{-1}$ and the inverse of g by $g^{-1}$. In our example $f^{-1}(x) = g(x)$ and $g^{-1}(x) = f(x)$. We can also see that the graph of g is the reflected image of the graph of f about the line y = x.

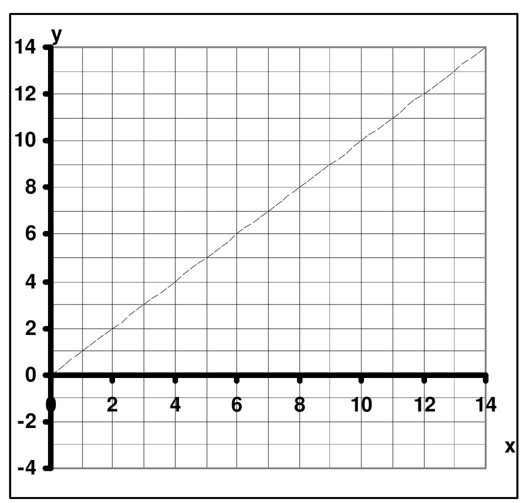
An easy way to find an inverse function follows.

Find the inverse of the function defined by $y = 2\sqrt{x}$ .

| | |
|---|---|
| The original function: | $y = 2\sqrt{x}$ |
| Solve the original equation for x: | $y^2 = 4x$ |
| | $0.25y^2 = x$ |
| Switch *x* and *y*; Here is the inverse. | $y = 0.25x^2$ |

Now find the inverse of the function defined by y = 2x + 3. Graph the original function and its inverse.

| | |
|---|---|
| The original function: | |
| Solve the original equation for x: | |
| | |
| Switch *x* and *y*; Here is the inverse. | |



Find and graph the inverse of the function defined by $y = \frac{5}{x+2}$. Graph both the original function and its inverse.