Algebra: 3-6 worksheet

Practice with inverses.
For each of the following functions, calculate its inverse.

- $a(x) = \frac{x}{2} + 1$

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

- $c(x) = -\sqrt[3]{x+1} + 2$

- $d(x) = \frac{1}{x}$

- $e(x) = \frac{1}{x^3}$

- $f(x) = 2 - \frac{1}{x+1}$

Yesterday we saw that a function has an inverse if and only if it is one-to-one. If a function is not one-to-one, we can get an almost inverse by restricting the domain. Let's see how this works by looking at the x^2 function.

1. Sketch a graph of $s(x) = x^2$, and use that graph to explain why $s(x)$ is not one-to-one.

2. Restrict the domain of $s(x)$ to $x \geq 0$. Look at the graph on this restricted domain, and explain why the function is one-to-one on this restricted domain.

3. Reflect the graph of $s(x) = x^2$, $x \geq 0$ along the line $y = x$ to get the graph of its inverse.

4. Solve the equation $y = x^2$, where $x \geq 0$, for x to get a formula for the inverse.

5. Find the inverse of $r(x) = \sqrt{x}$. What is the domain of $r^{-1}(x)$?