Sample Exercises:

1. Write an equation for the inverse of the relation.

a. $y = 3x + 2$

$f^{-1}(x) = \frac{x}{3} - \frac{2}{3}$

b. $y = 9x - 14$

$f^{-1}(x) = \frac{x+14}{9}$

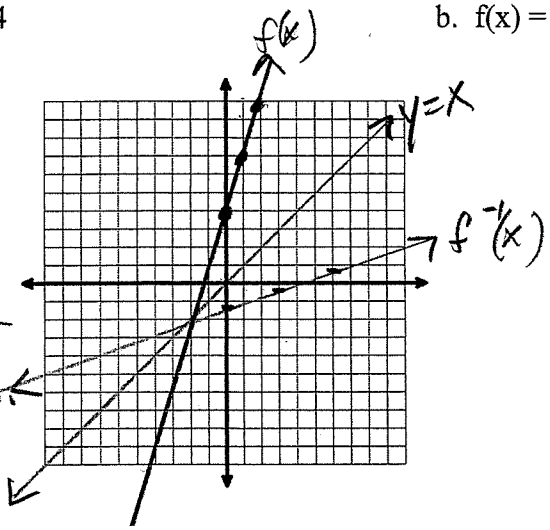
2. Sketch the function and its inverse in the same coordinate plane. Is the inverse a function of x?

a. $f(x) = 3x + 4$

$x = 3y + 4$

$\frac{x-4}{3} = y$

$f^{-1}(x) = \frac{x}{3} - \frac{4}{3}$



Yes, a function

b. $f(x) = 2x^2 + 4$

$y = \pm\sqrt{\frac{x}{2} - 2}$

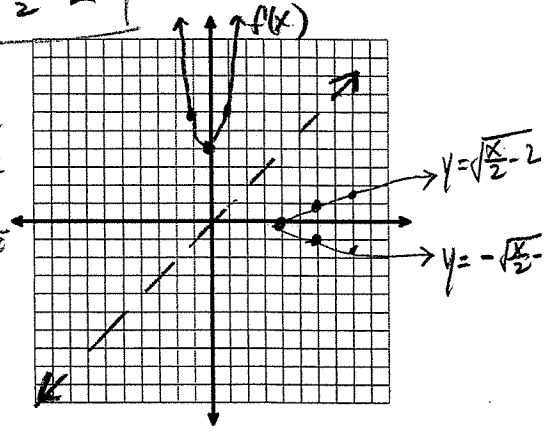
No, inverse not a function.

$y = 2x^2 + 4$

$x = 2y^2 + 4$

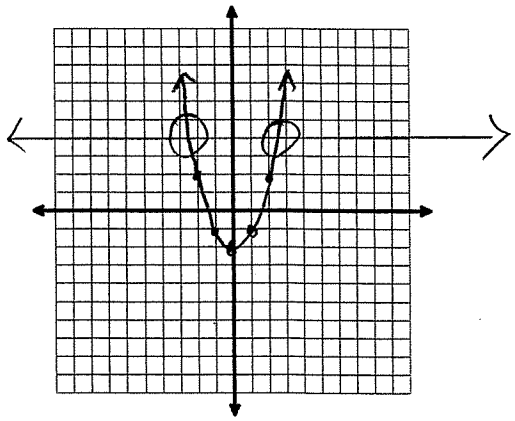
$\frac{x-4}{2} = y^2$

$y = \pm\sqrt{\frac{x-4}{2}}$



3. Sketch the graph of the function. Use the graph of f(x) to decide whether the inverse of f(x) is a function of x.

a. $f(x) = x^2 - 2$



Since f(x) fails the horizontal line test, the inverse is NOT a function.

4. Verify that f and g are inverses of each other.

a. $f(x) = \frac{1}{2}x + 2$ $\quad g(x) = 2x - 4$

$f(g(x)) = \frac{1}{2}(2x-4) + 2$

$= x - 2 + 2$

$= x$

$g(f(x)) = 2(\frac{1}{2}x + 2) - 4$

$= x + 4 - 4$

$= x$ ✓

Yes, f & g are inverses of each other.

b. $f(x) = -4x + 8$ $\quad g(x) = \frac{-1}{4}x + 2$

$f(g(x)) = -4(-\frac{1}{4}x + 2) + 8$

$= x - 8 + 8$

$= x$ ✓

$g(f(x)) = -\frac{1}{4}(-4x + 8) + 2$

$= x - 2 + 2$

$= x$ ✓

Yes, f & g are inverses of each other.