Inverse Functions

If $f(x) = \{(x, y)\}$, then $f^{-1} = \{(y, x)\}$

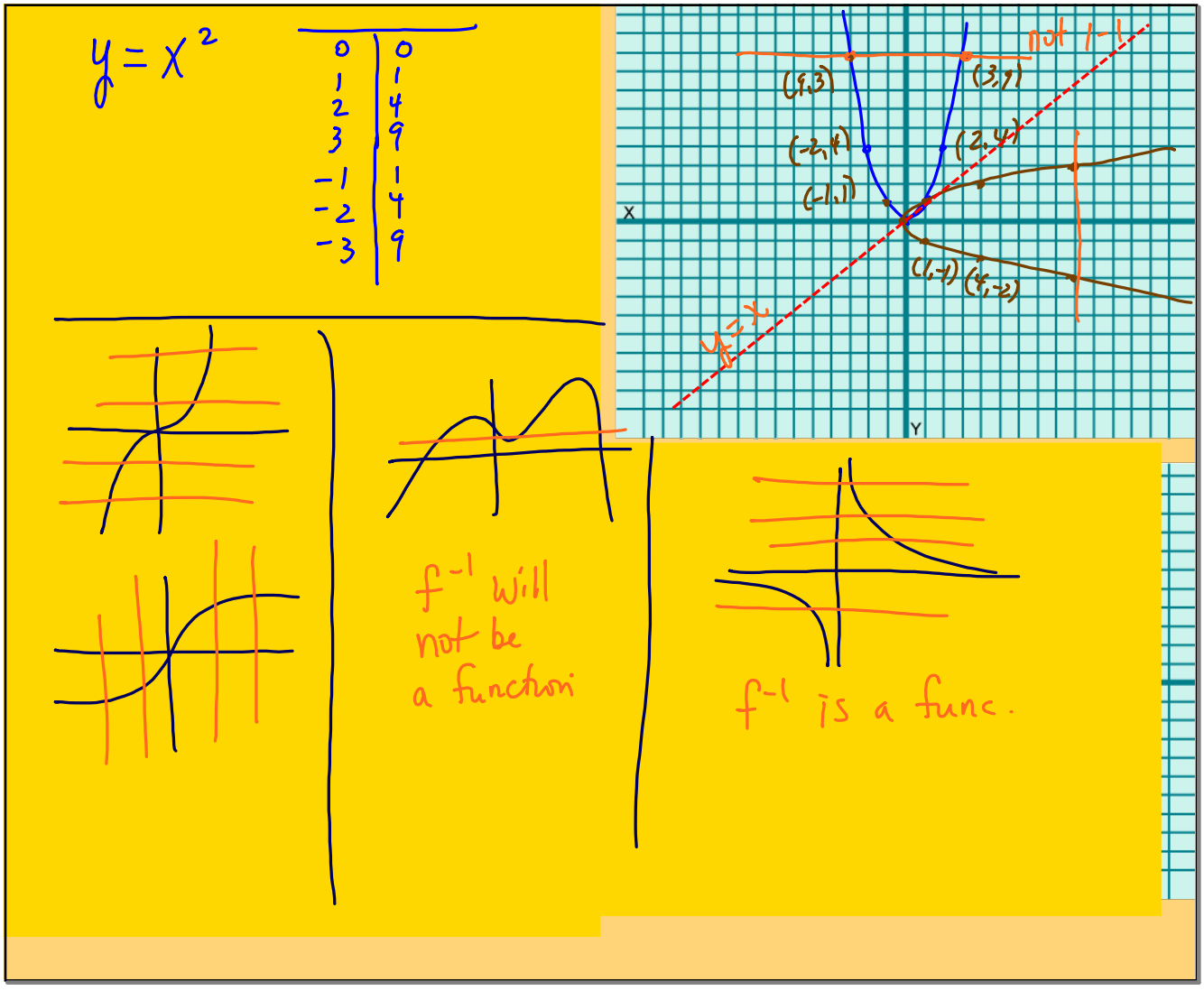
$f(x) = \{(0, 2)\ (-5, 3)\ (8, 7)\}$

$f^{-1}(x) = \{(2, 0)\ (3, -5)\ (7, 8)\}$

one-to-one function —
Each x-coord & Each y-coord are only used once
- must pass horiz line test

$f(x) = \{(9, 7)\ (0, 7)\ (-4, 7)\}$

$f^{-1}(x) = \{(7, 9)\ (7, 0)\ (7, -4)\}$ Not a func.


y = x²
0 0
1 1
2 4
3 9
-1 1
-2 4
-3 9
not 1-1
(3,3)
(-2,4)
(2,4)
(-1,1)
(1,-1)
(4,-2)
y = x
X
Y
f⁻¹ will not be a function
f⁻¹ is a func.

Find the equation of f^{-1}

$f(x) = 4x - 7$

$y = 4x - 7$

$x = 4y - 7$

$\frac{x+7}{4} = \frac{4y}{4}$

$\frac{x+7}{4} = f^{-1}(x)$

1.) Switch x + y
2) Solve for y.

$f(x) = \sqrt[3]{\frac{x+2}{7}}$

y

$x^3 = \left(\sqrt[3]{\frac{y+2}{7}}\right)^3$

$7x^3 = \frac{y+2}{7}$

$7x^3 = y + 2$

$7x^3 - 2 = y$

$7x^3 - 2 = f^{-1}(x)$

$f(x) = \frac{3x+2}{4x-5}$

$y = \frac{3x+2}{4x-5}$

$(4y-5)x = \frac{3y+2}{4y-5}(4y-5)$

$4xy - 5x = 3y + 2$

$4xy - 3y = 5x + 2$

$y(4x-3) = 5x+2$

$\frac{y(4x-3)}{4x-3} = \frac{5x+2}{4x-3}$

$f^{-1}(x) = \frac{5x+2}{4x-3}$

$f(x) = \frac{3x+7}{4}$ $g(x) = \frac{4x-7}{3}$

Are f + g inverses of each other.

$(f \circ g)(x)$ or $(g \circ f)(x) = x$

$f \circ g = \frac{3\left(\frac{4x-7}{3}\right)+7}{4}$

$= \frac{4x-7+7}{4}$

$= x$

yes, f + g are inverse functions