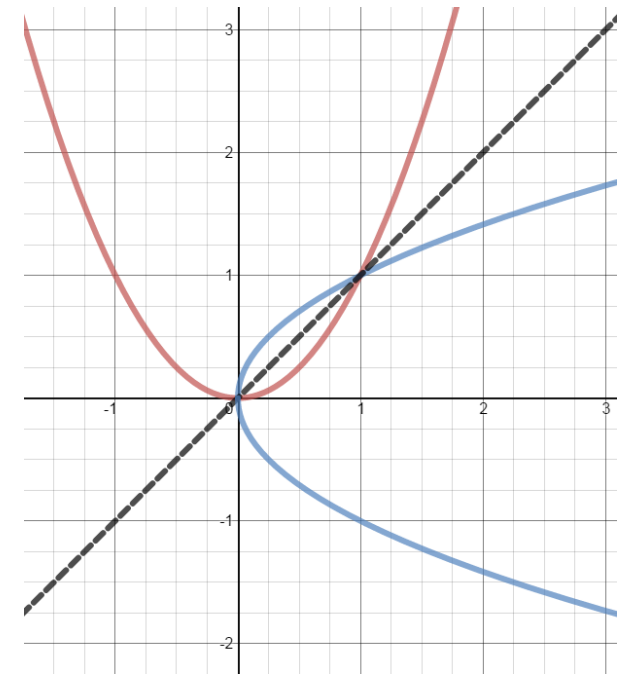
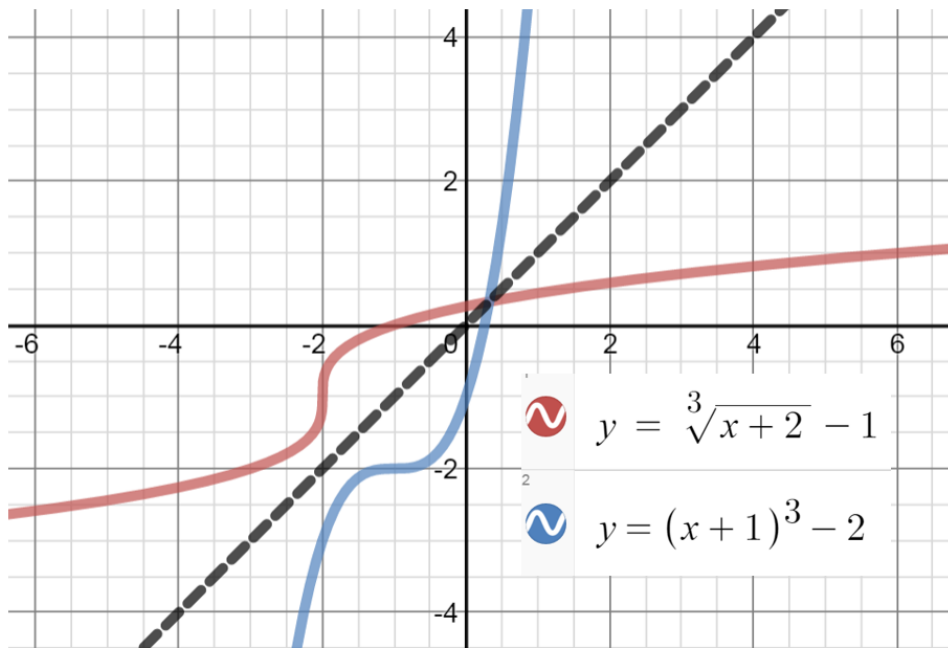


Inverse of a Function

Section 5.6




Observations...

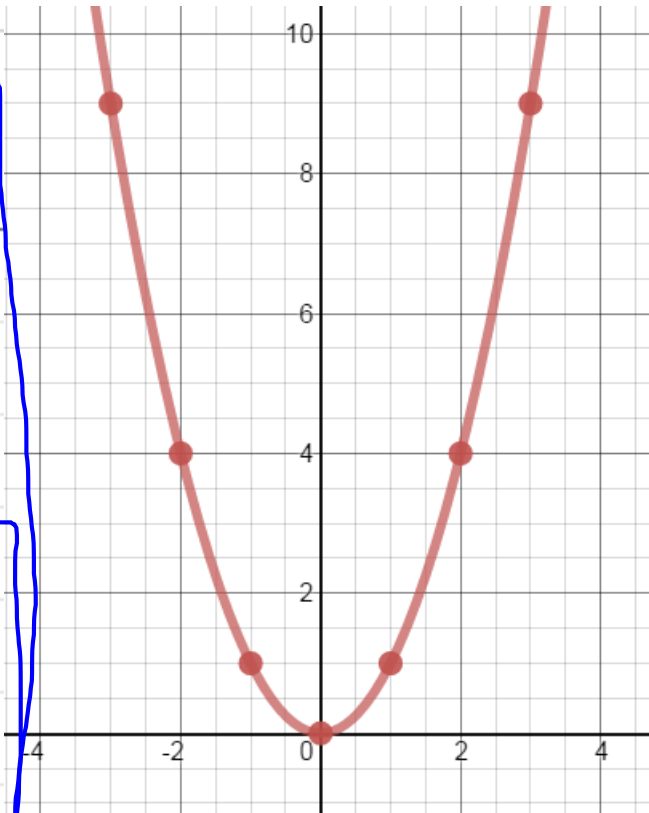
opposite functions (inverse)



$$y = x^2$$

2

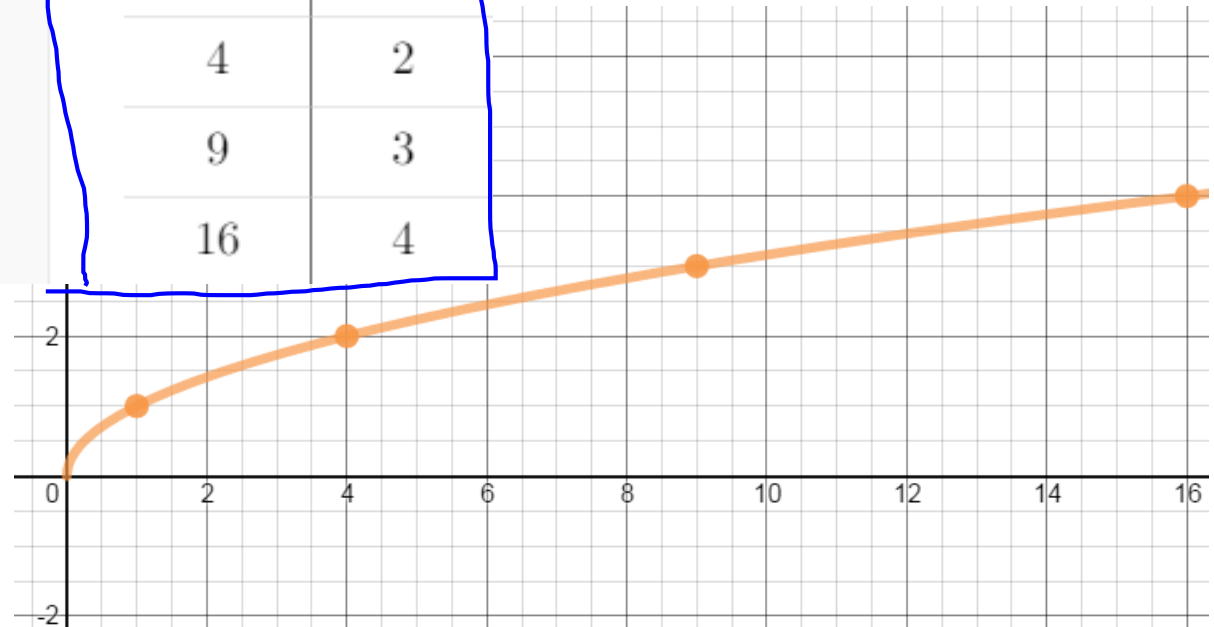
x_1	 y_1
-3	9
-2	4
-1	1
0	0
1	1
2	4
3	9



$$y = \sqrt{x}$$

2

x_1	 y_1
1	1
4	2
9	3
16	4



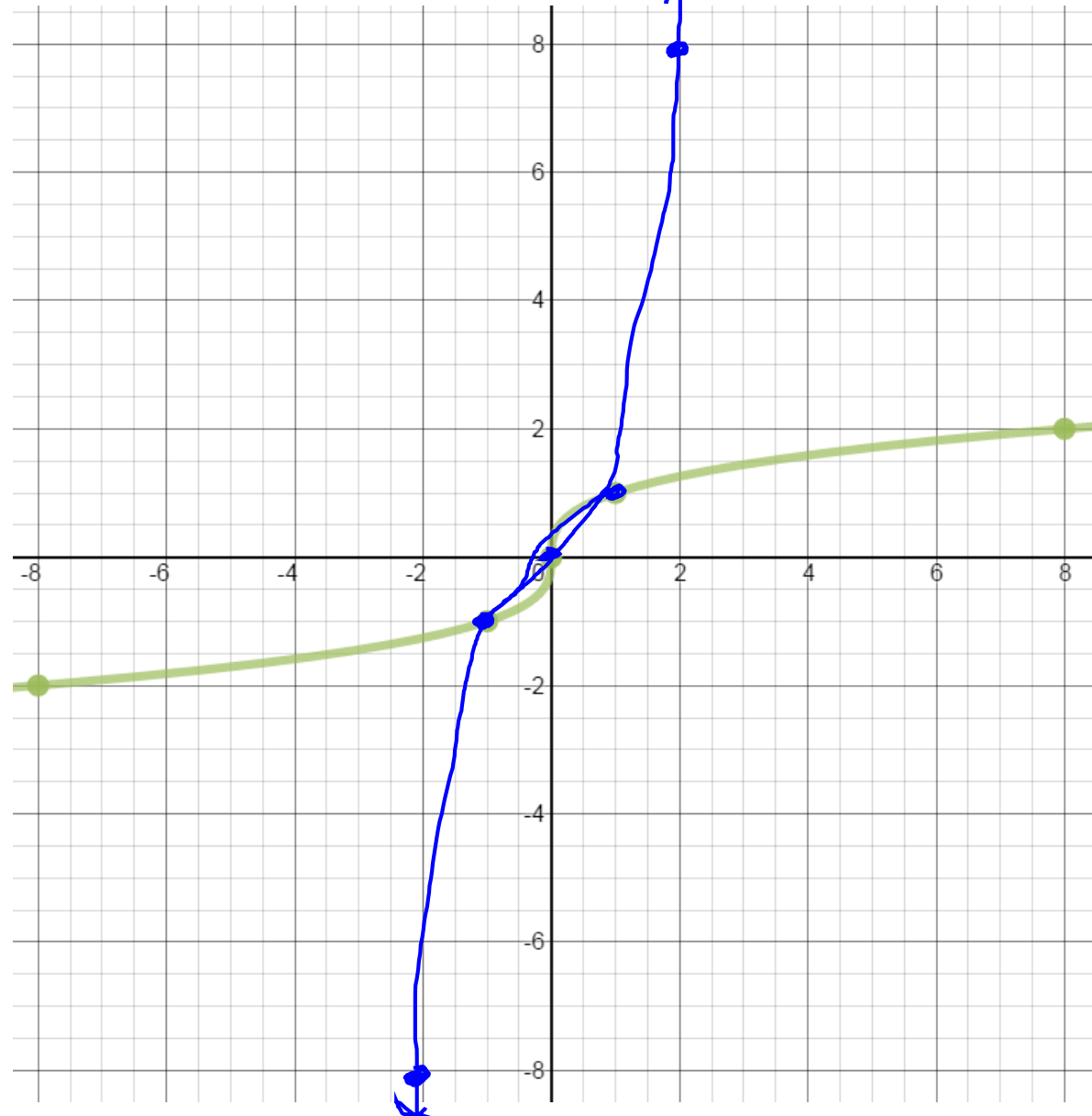
Observations

Opposites \Leftrightarrow inverses

$$y = x^3$$

x_1	y_1
-8	-2
-1	-1
0	0
1	1
8	2

x_1	y_1
-2	-8
-1	-1
0	0
1	1
2	8



1

2

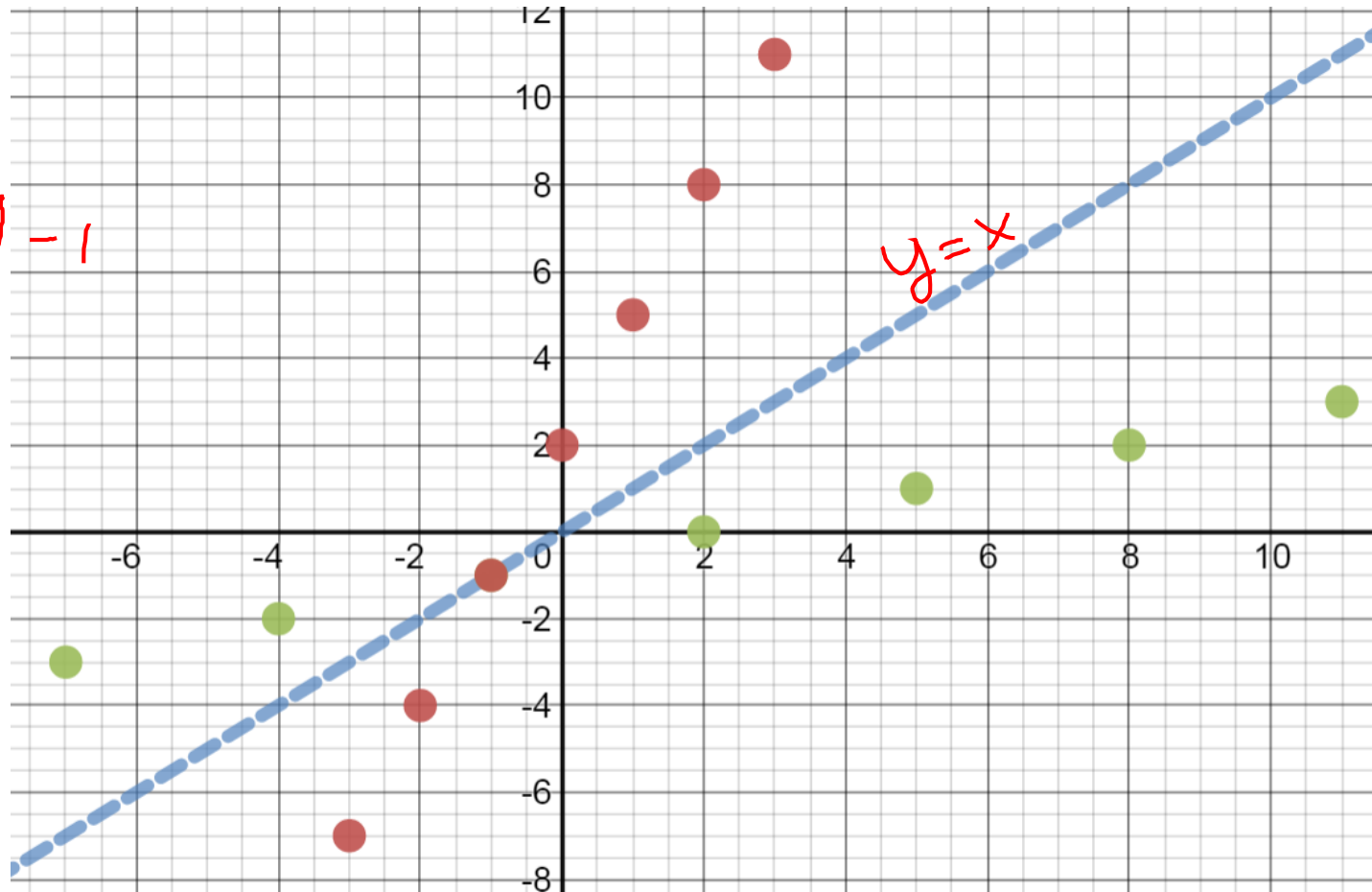


$$\sqrt[3]{x}$$

If the table represents a function, find its inverse.

x	y	x	y
-3	-7	-7	-3
-2	-4	-4	-2
-1	-1	-1	-1
0	2	2	0
1	5	5	1
2	8	8	2
3	11	11	3

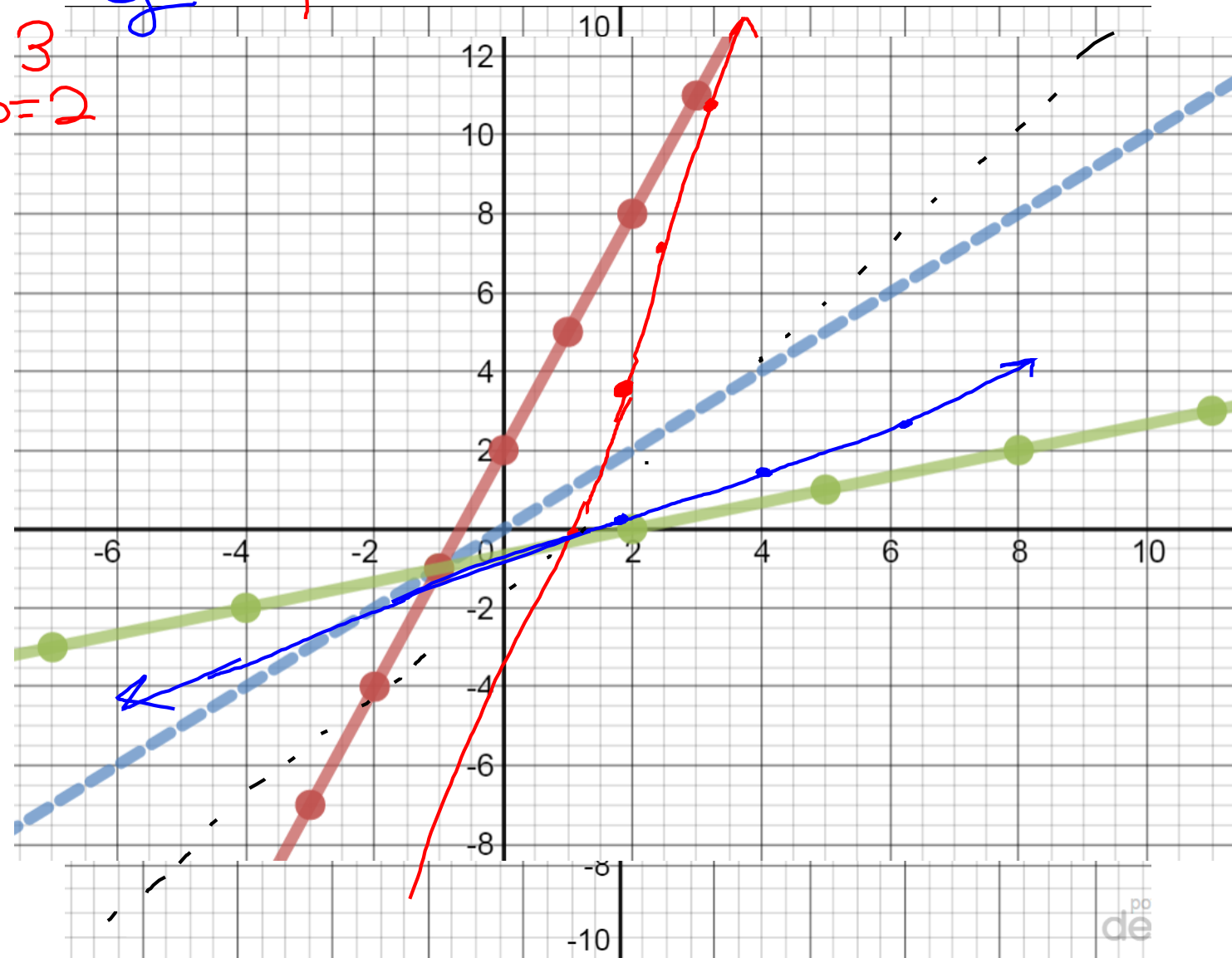
$m = 3/1$ (slope of original function)
 $m = 1/3$ (slope of inverse function)
 A red bracket on the first two rows of the original table is labeled '3', and a red bracket on the first two rows of the inverse table is labeled '-1'.



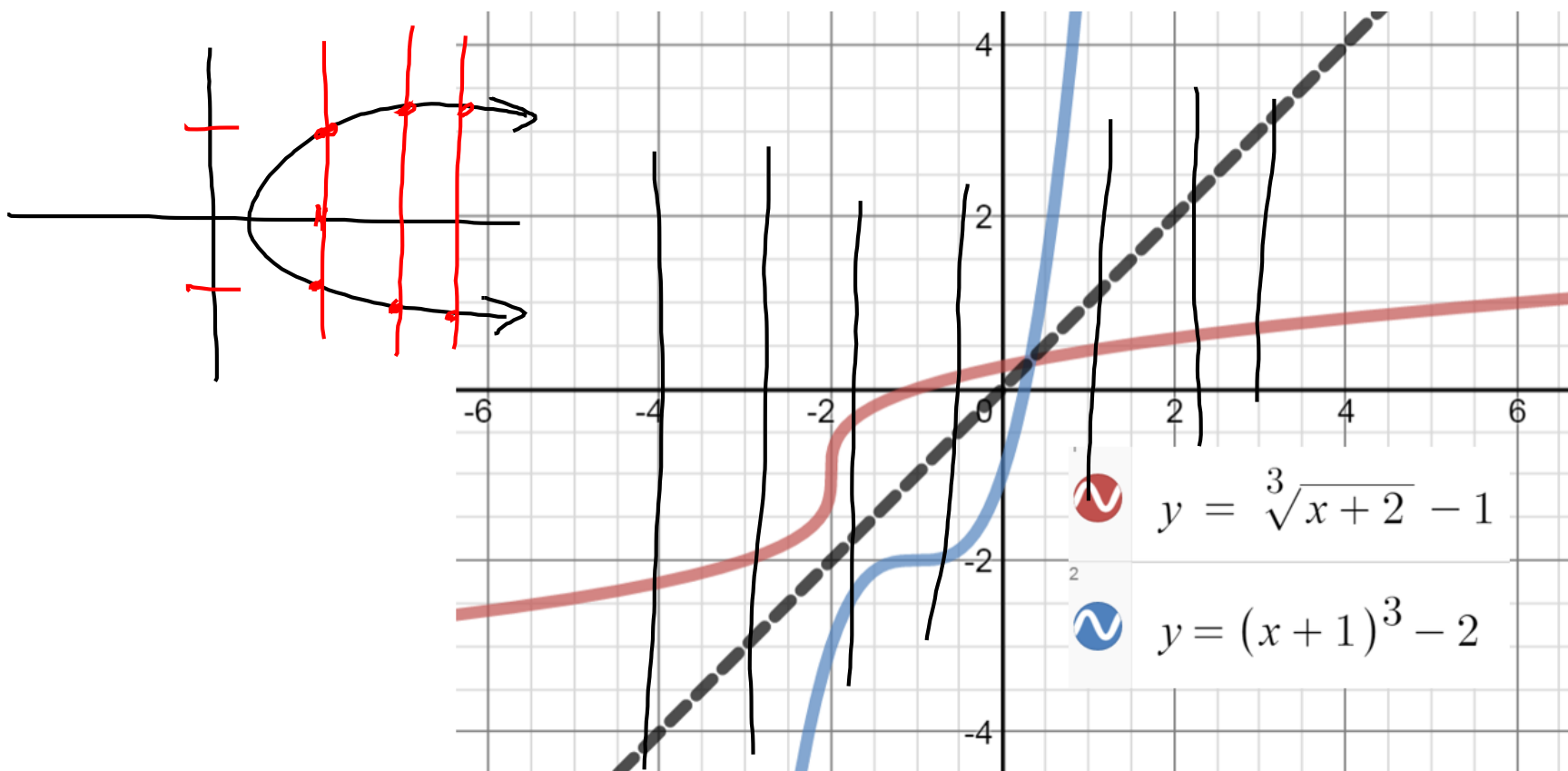
Find the inverse of ~~f(x)~~ = 3x + 2.

$$\begin{aligned} &\rightarrow y = 3x + 2 \\ y = mx + b &\rightarrow \\ &\rightarrow x = 3y + 2 \\ &\quad -2 \quad \quad -2 \\ \hline &\frac{x}{3} - \frac{2}{3} = y \\ &y = \frac{x}{3} - \frac{2}{3} \end{aligned}$$

$$\begin{aligned} m &= 3 \\ b &= 2 \end{aligned}$$



How are the functions below related?



$$y = \sqrt[3]{x+2} - 1$$

$$y = (x+1)^3 - 2$$

Is the inverse of $g(x) = 3x^3 - 2$ a function? If so, find its inverse.

1) Change $f(x)$ to y
 $g(x)$

$$y = 3x^3 - 2$$

2) Switch x & y

$$x = 3y^3 - 2$$

3) Solve for y
(get it by itself)

$$\begin{array}{r} x = 3y^3 - 2 \\ + 2 \qquad + 2 \\ \hline \end{array}$$

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

$$\sqrt[3]{\frac{x+2}{3}} = \sqrt[3]{y^3}$$

$$y = \sqrt[3]{\frac{x+2}{3}}$$

Find the inverse of the equations graphed below.

$$\begin{aligned}x &= \sqrt{y-2} + 3 \\ -3 & \\ (x-3)^2 &= (\sqrt{y-2})^2 \\ (x-3)^2 &= y-2 \\ +2 & \quad +2 \\ y &= (x-3)^2 + 2\end{aligned}$$

