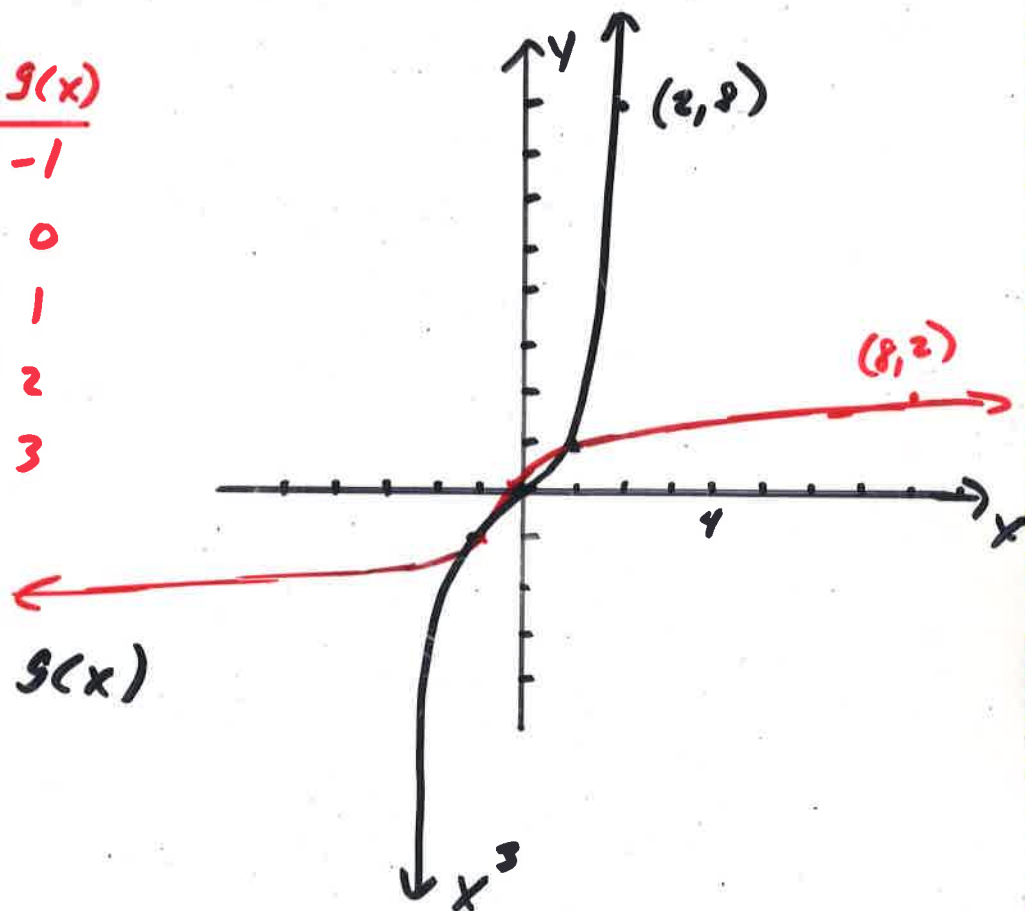


6.7 INVERSE FUNCTIONS

CONSIDER $f(x) = x^3$ AND $g(x) = \sqrt[3]{x}$

x	$f(x)$	x	$g(x)$
-1	-1	-1	-1
0	0	0	0
1	1	1	1
2	8	8	2
3	27	27	3



NOTE: $f(x)$ AND $g(x)$
WILL "UNDO"
EACH OTHER.

$$f(2) = 8$$

$$g(8) = 2$$

$g(x)$ IS THE "INVERSE" OF $f(x)$.

$$g(x) = f^{-1}(x)$$

THIS IS READ
"f INVERSE OF x"

NOTE: $f(f^{-1}(x)) = x$ AND

$$f^{-1}(f(x)) = x$$

TO FIND THE INVERSE OF $f(x)$...

- ① REPLACE $f(x)$ WITH Y .
- ② INTERCHANGE X AND Y .
- ③ SOLVE FOR Y
- ④ REPLACE Y WITH $f^{-1}(x)$.

EX: LET $f(x) = \sqrt{x^2 - 3}$

FIND $f^{-1}(x)$.

$$Y = \sqrt{x^2 - 3}$$

$$X = \sqrt{y^2 - 3}$$

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

$$x^2 + 3 = y^2$$

$$Y = \sqrt{x^2 + 3}$$

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

Ex: Let $f(x) = (2x - 1)^2$

Find $f^{-1}(x)$

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

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

$$\sqrt{x} = 2y - 1$$

$$\rightarrow 2y = \sqrt{x} + 1$$

$$y = \frac{\sqrt{x} + 1}{2}$$

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

Ex: Find Inverse of $y = 3x - 4$

$$y = 3x - 4$$

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

$$3y = x + 4$$

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

INVERSE:

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