PRACTICE

For each set of ordered pairs, determine if the set is a function, a one-to-one function, or neither.

1. (5,4),(4,3),(3,3),(2,4)

Function

2. (0,5),(-4,5),(-4,2),(0,2)

Neither

Determine if the function is one-to-one.

3.

Domain	Range
-2	-4
-1	-2
0	0
1	1
2	5

One-to-one

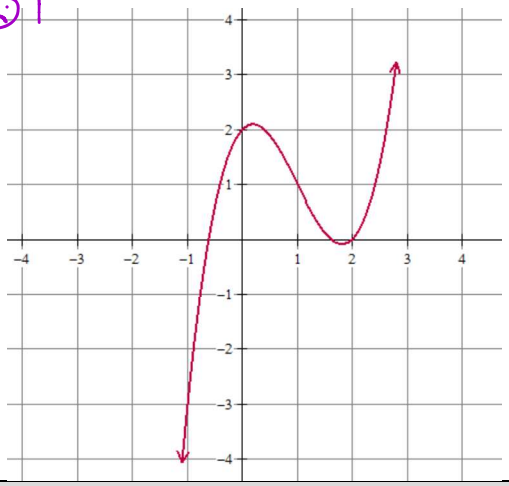
4.

Domain	Range
-2	-3
-1	
0	7
1	
2	9

NOT

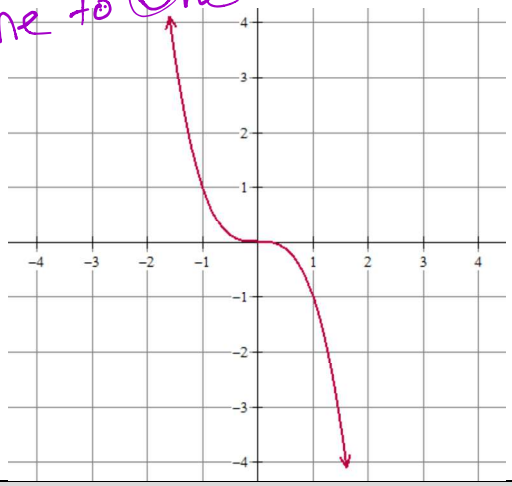
5.

NOT



6.

One to One



Determine if *g* is the inverse of *f*.

7. $f(x) = 3x + 5$ and $g(x) = \frac{1}{3}x - \frac{5}{3}$

$f(g(x)) = 3(g) + 5$

$= 3\left(\frac{1}{3}x - \frac{5}{3}\right) + 5$

$= x - 5 + 5$

$f(g(x)) = x$

$g(f(x)) = \frac{1}{3}(f) - \frac{5}{3}$

$= \frac{1}{3}(3x+5) - \frac{5}{3}$

$= x + \frac{5}{3} - \frac{5}{3}$

$g(f(x)) = x$

f and g are inverses

8. $f(x) = \sqrt[3]{3 - x}$ and $g(x) = x^3 - 3$

$f(g(x)) = \sqrt[3]{3 - g}$

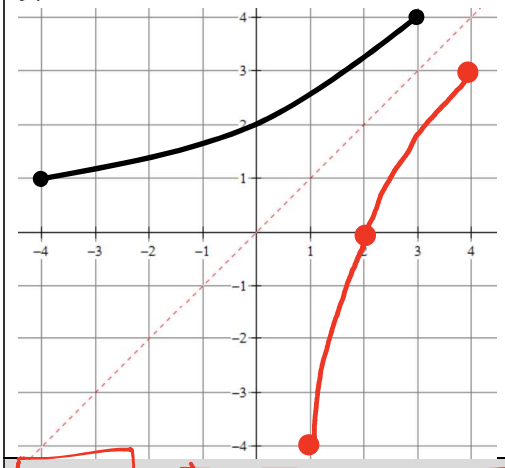
$= \sqrt[3]{3 - (x^3 - 3)}$

$f(g(x)) = \sqrt[3]{6 - x^3}$

f and g are NOT inverses

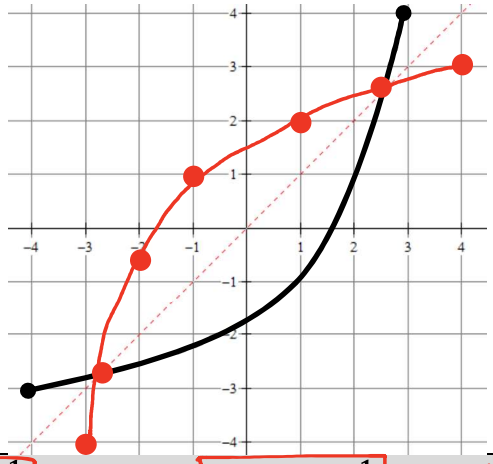
Find the domain and range of f, sketch the graph of f^{-1}, and find the domain and range of f^{-1}. The graph of $y = x$ is provided.

9.



f	
D:	$[-4,3]$
R:	$[1,4]$
f^{-1}	
D:	$[1,4]$
R:	$[-4,3]$

10.



f	
D:	$[-4,3]$
R:	$[-3,4]$
f^{-1}	
D:	$[-3,4]$
R:	$[-4,3]$

Graph f and verify that f is one-to-one function. Find f^{-1} and add the graph of f^{-1} and the line $y = x$ to the graph f. State the domain and range of f and the domain and range of f^{-1}.

11. $f(x) = -\sqrt{x+1} + 3$

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

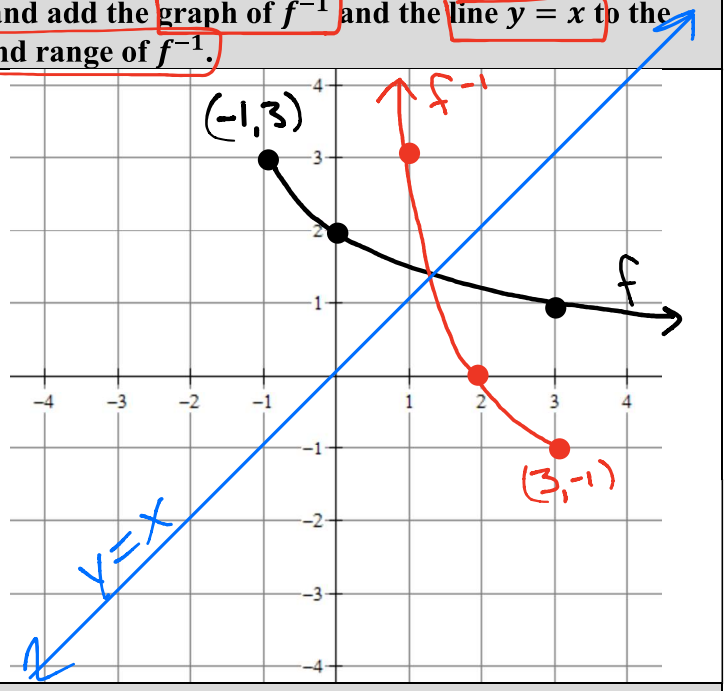
$x - 3 = -\sqrt{y+1}$

$-(x-3) = \sqrt{y+1}$

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

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

$\rightarrow f^{-1} = (x-3)^2 - 1,\ x \le 3$



f	f^{-1}
D: $[-1,\infty)$	D: $(-\infty,3]$
R: $(-\infty,3]$	R: $[-1,\infty)$

The function is one-to-one. Find f^{-1}.

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

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

$x(y-1) = 2$

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

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

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

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

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

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

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

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

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

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

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

REVIEW SKILLS

Use the quadratic formula to solve. Express your solution(s) in exact and decimal form.

1. $2b^2 - 19 = -b$

$2b^2 + b - 19 = 0$

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$x = \frac{-(1) \pm \sqrt{(1)^2 - 4(2)(-19)}}{2(2)}$

$x = \frac{-1 \pm \sqrt{1 + 152}}{4}$

$x = \frac{-1 \pm \sqrt{153}}{4}$

$x = \frac{-1 \pm 3\sqrt{17}}{4}$

$x \approx -3.342, 2.842$

2. $r^2 = 2r - 8$

$r^2 - 2r + 8 = 0$

$r = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$r = \frac{-(-2) \pm \sqrt{(-2)^2 - 4(1)(8)}}{2(1)}$

$r = \frac{2 \pm \sqrt{4 - 32}}{2}$

$r = \frac{2 \pm \sqrt{-28}}{2}$

$r = \frac{2 \pm 2i\sqrt{7}}{2}$

$r = \frac{2(1 \pm i\sqrt{7})}{2}$

$r = 1 \pm i\sqrt{7}$

$r \approx 1 - 2.646i, 1 + 2.646i$