

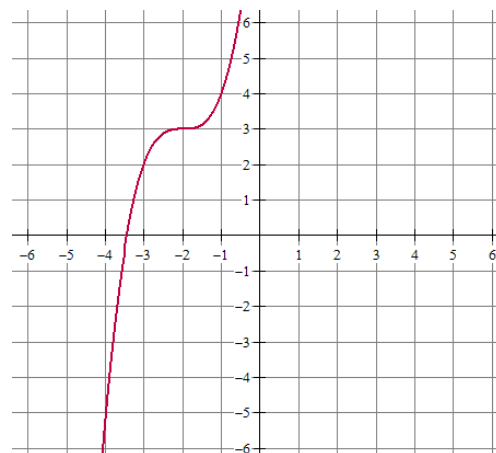
4.4 Inverse Functions

Pre-Calculus

Write your questions here!



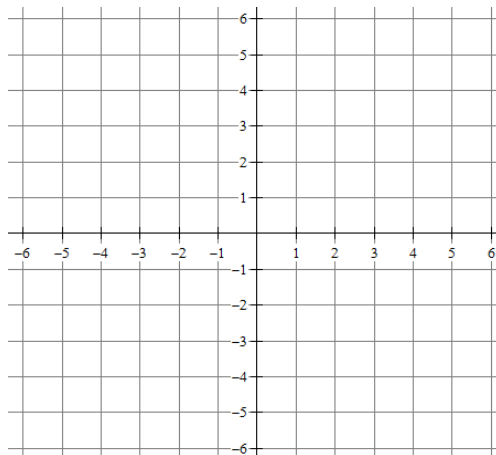
$$f(x) = (x + 2)^3 + 3$$



x	$f(x)$

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

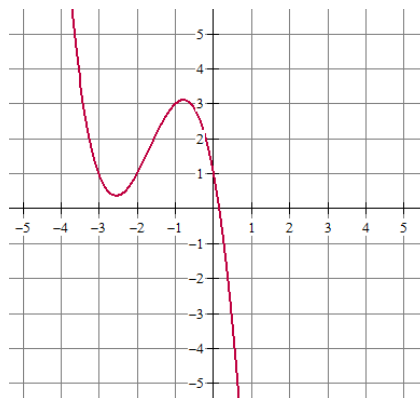
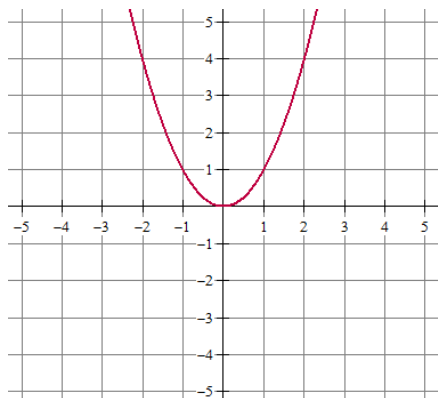
$$f(x) = -2\sqrt{x - 3} - 2$$



$f(x)$
DOMAIN:
RANGE:

$f(x)^{-1}$
DOMAIN:
RANGE:

Does the function have an inverse?

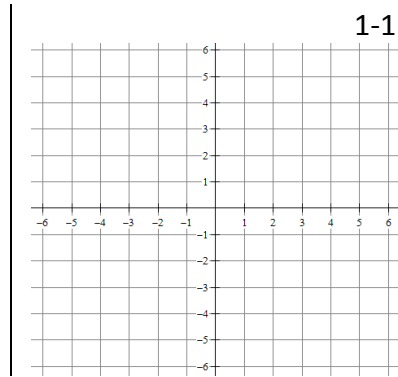


x	$f(x)$
-2	5
0	7
2	-5
5	7

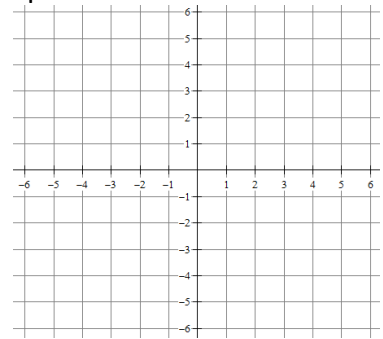
MAPPING

A one-to-one function passes the VLT and HLT.

1-1 MAPPING



1-1 Graph



PROVE 2 FUNCTIONS ARE INVERSES!

Are $f(x) = \frac{2}{x+3}$ and $g(x) = \frac{2}{x} - 3$ inverses?

BRING THE PAIN

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

SUMMARY:

Now,
summarize
your notes
here!



4.4 Inverse Function

PRACTICE

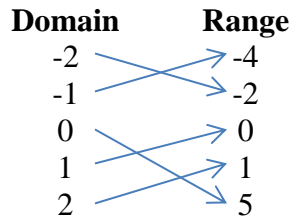
For each set of ordered pairs, determine if the set is a function, a one-to-one function, or neither.

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

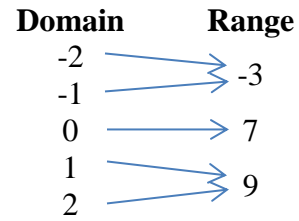
2. $(0,5), (-4,5), (-4,2), (0,2)$

Determine if the function is one-to-one.

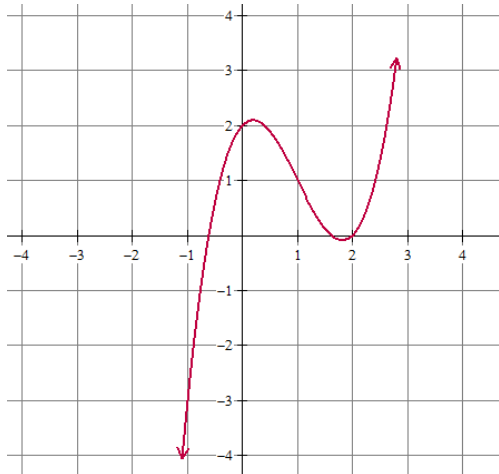
3.



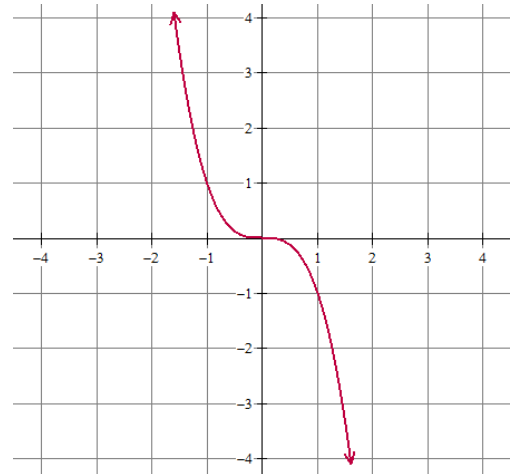
4.



5.



6.

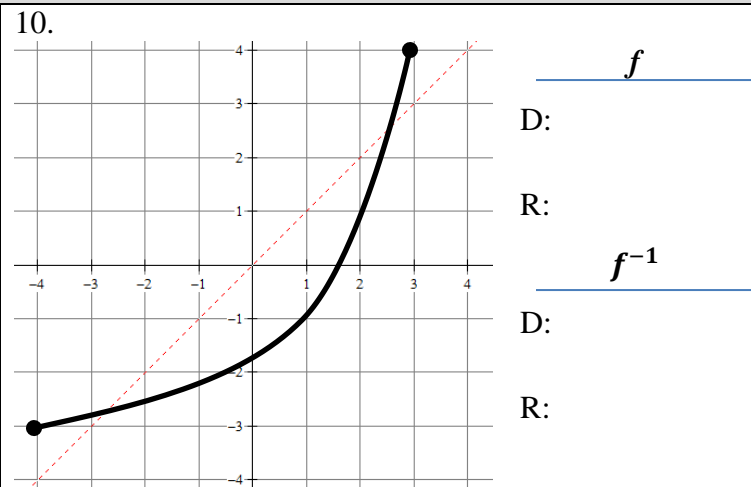
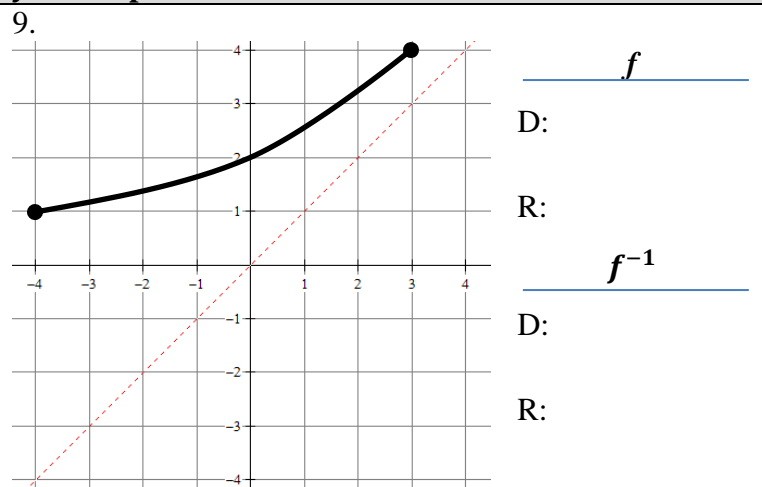


Determine if g is the inverse of f .

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

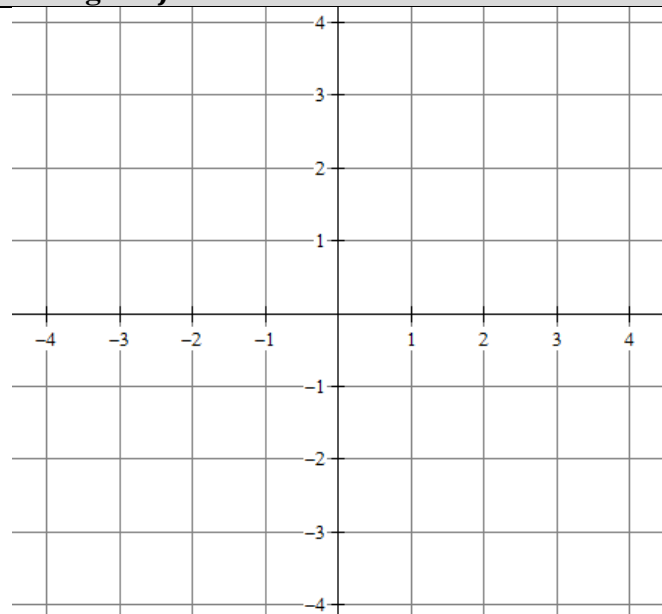
8. $f(x) = \sqrt[3]{3-x}$ and $g(x) = x^3 - 3$

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.



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



f	f^{-1}
D:	D:
R:	R:

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

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

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

REVIEW SKILLS

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

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

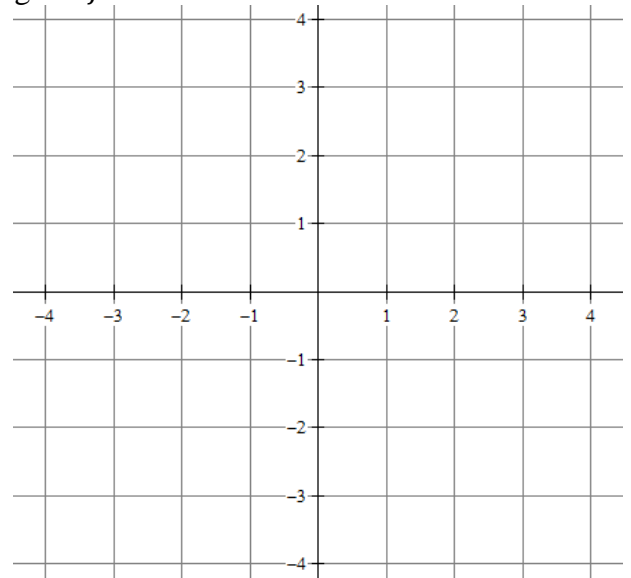
2. $r^2 = 2r - 8$

4.4 Inverse Functions

APPLICATION

1. 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} .

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



f

f^{-1}

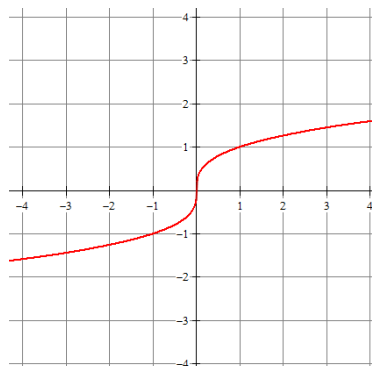
D:

D:

R:

R:

2. The graph shows $f(x)$. On the same graph, sketch $f^{-1}(x)$.



3. Graph $f(x) = \frac{x-2}{x+2}$ in Y_1 of the graphing calculator with a “Standard Window”. Find the $f^{-1}(x)$ and graph it in Y_2 of the graphing calculator. Graph $f(x) = x$ in Y_3 and use it to answer the following:

a. Explain why the functions are inverses according to your graph.

x	$f(x)$	$f^{-1}(x)$
5		
-3		
-1		
0		
2		
-6		

b. Fill in the table and explain why they are inverses according to your table.

c. **BONUS CHALLENGE FOR THE ALGEBRA ROCK STARS ONLY!**

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

4. Complete the table of values given that f and g are inverse functions of each other.

x	$f(x)$	$g(x)$
0	5	2
1	3	4
2		
3	9	
4		7
5	2	

5. What is unique about the inverse function of $f(x) = \frac{x}{x-1}$?