October 23

If $f(x) = 3x^2 - 7$ and $g(x) = \sqrt{3(x + 7)}$

are they inverse functions?

Explain your reasoning.

$f(g(x)) = x = g(f(x))$

$f(\sqrt{3(x+7)}) = 3(\sqrt{3(x+7)})^2 - 7 = 3(3(x+7)) - 7$

$= 3(3x+21) - 7 = 9x + 63 - 7$

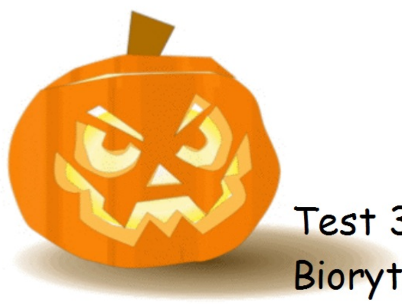
$= 9x + 56 \neq x$

$y = 3x^2 - 7$

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

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

$\sqrt{\frac{y+7}{3}} = x$



Test 3 - THURSDAY Oct 24th

Biorythm projects due WEDNESDAY Oct 30th

Corrections for test 2 due MONDAY Nov 4th

October 23

Students will verbally explain how to

find the inverse function

(using the words:

domain, range, opposite ...)

x	-1	0	1	2	3
$n(x)$	0	-2	2	-1	1

x	-1	0	1	2	3
$r(x)$	2	-1	3	1	-2

(a) $r^{-1}(-1) = 0$

(b) $n^{-1}(2) = 1$

(c) $r^{-1}(-1) + n^{-1}(-1) = 2$

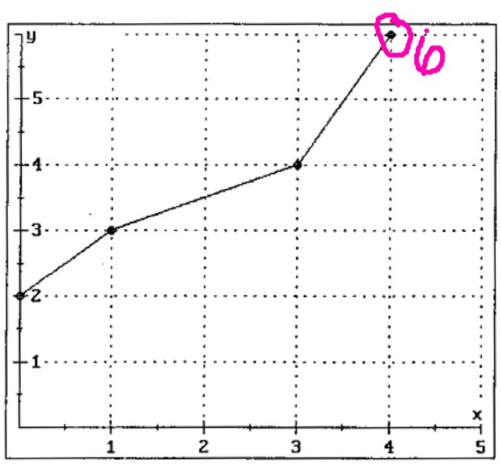
(d) $r(n^{-1}(2)) = 3$

(e) $r^{-1}(r(3)) = 3$

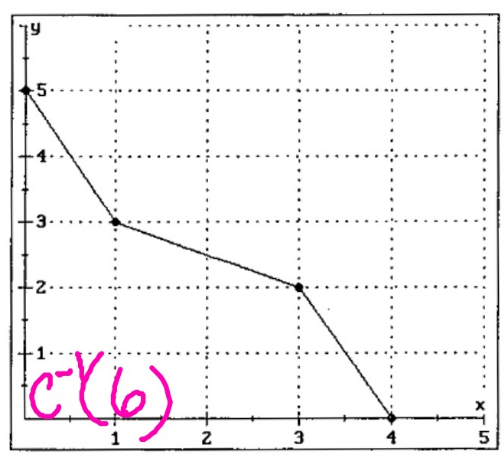
(f) $r(r^{-1}(1)) = 1$

(g) $n(n^{-1}(-1)) = -1$

(h) $n^{-1}(n(2)) = 2$



$b(x)$



$c(x)$

(a) $b^{-1}(4) = 3$

(b) $c^{-1}(3) = 1$

(c) $b^{-1}(c(1)) = 1$

(d) $c^{-1}(c(1)) = 1$

x

(e) $c^{-1}(b(4)) =$ none

(f) $c(b^{-1}(4)) = 2$

$c(3)=2$

(g) $b(c^{-1}(0)) = 6$

(h) $b^{-1}(b(2)) = 2$

Inverses (pp. 1 of 2)

The ***inverse*** of a relation is formed by interchanging (or switching) the two variables.

In Table A, write down the coordinates for points on the given function.

In Table B, switch the *x*- and *y*-values in these coordinates to create the inverse relation.

Then graph.

Table A

x	*y*
-2	1
-1	2
0	3
1	4
4	5
7	6

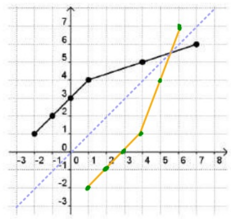


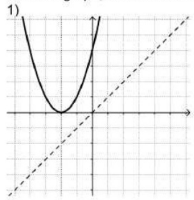
Table B

x	*y*
1	-2
2	-1
3	0
4	1
5	4
6	7

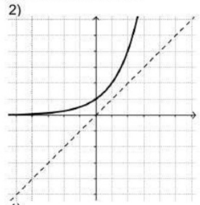
Graphically, a relation and its inverse will be reflections over the line ***y* = *x***. Graph this line on the same gird (above).

On each graph, sketch the inverse of the relation shown.

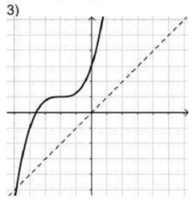
1)



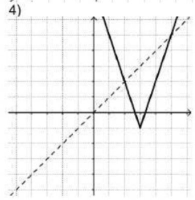
2)



3)



4)



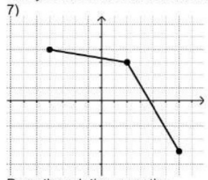
5) Which of the original relations are *functions*? How do you know?

6) Which of the relations have inverses that are functions? How do you know?

Inverses (pp. 2 of 2)

Tell whether each relation below would pass a vertical or horizontal "line test." Then explain what this tells you about the relation and its inverse.

7)

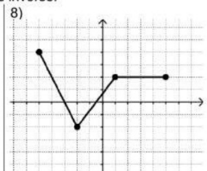


Does the relation pass the vertical line test?

Does the relation pass the horizontal line test?

What does this tell you about the relation?

8)

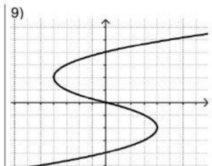


Does the relation pass the vertical line test?

Does the relation pass the horizontal line test?

What does this tell you about the relation?

9)



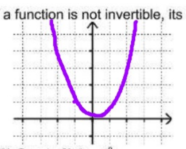
Does the relation pass the vertical line test?

Does the relation pass the horizontal line test?

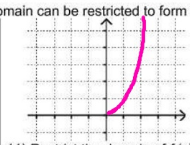
What does this tell you about the relation?

Terminology All functions have the property that each element in the domain is paired with only one element in the range. A function is said to be ***one-to-one*** if each range value is also paired with only one element from the domain.
One-to-one functions will pass both the vertical and horizontal line tests.
This type of function is also said to be ***invertible***, meaning that its inverse is also a function.
If a function ***f*(*x*)** is *invertible*, then its inverse can be named with the notation $f^{-1}(x)$.

If a function is not invertible, its domain can be restricted to form a function that is.

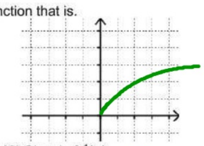


10) Graph $f(x) = x^2$.



11) Restrict the domain of $f(x)$ to make the function invertible.

$f(x) = x^2$, $x \geq 0$



12) Sketch $f^{-1}(x)$.

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