COLLEGE REVIEW MATH
SECTION 4E REVIEW
Inverse Functions

Name KEY

Suppose the function *f* has an inverse and f(-2) = 3, f(2) = -1, f(5) = -2 and f(3) = 0, then find:

1) $f^{-1}(3) =$ ___-2___

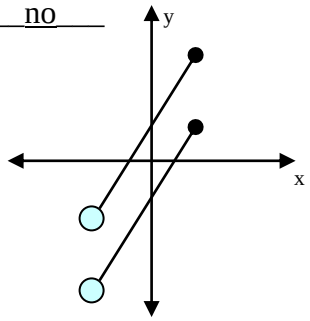
2) $f(f^{-1}(-1)) =$ ___-1___

3) $f^{-1}(-2) =$ ____5___

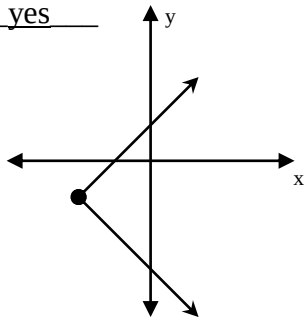
4) $f^{-1}(f^{-1}(0)) =$ ___-2___

Determine if the following graphs have an inverse.

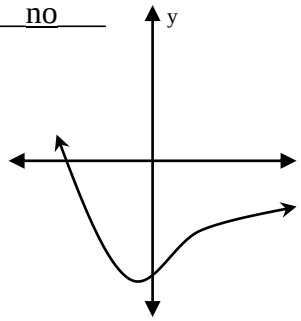
5) ___no___



6) __yes___



7) ___no___



Find a rule for the inverse of each function. (you may assume one exists)

8) f(x) = 5x – 3

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

9) $g(x) = \frac{1}{2}x + 6$

$x = \frac{1}{2}y + 6$
$x - 6 = \frac{1}{2}y$
$g^{-1}(x) = 2x - 12$

10) $h(x) = x^3 + 3$

$x = y^3 + 3$
$x - 3 = y^3$
$h^{-1}(x) = \sqrt[3]{x-3}$

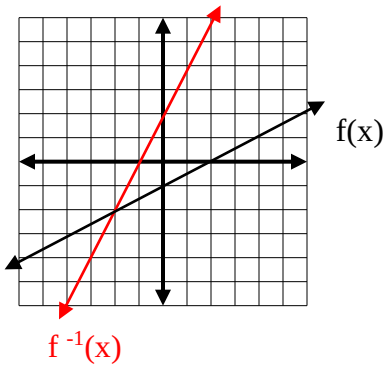
11) $f(x) = (x + 5)^2$; $x \geq -5$

$x = (y + 5)^2$
$\sqrt{x} = y + 5$
$f^{-1}(x) = \sqrt{x} - 5$

Sketch the graph for f(x) and $f^{-1}(x)$ on the same set of axes, then find a rule for $f^{-1}(x)$.

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

x	y	x	y
0	-1	-1	0
2	0	0	2
-2	-2	-2	-2



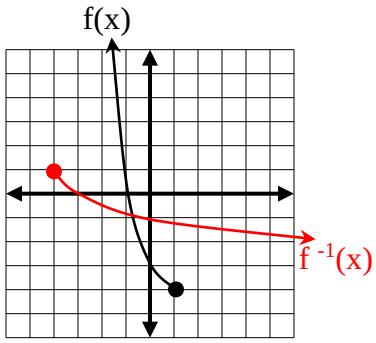
$x = \frac{1}{2}y - 1$

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

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

13) $f(x) = (x - 1)^2 - 4;\ x \leq 1$

x	y	x	y
1	-4	-4	1
0	-3	-3	0
-1	0	0	-1



$x = (y - 1)^2 - 4$

$x + 4 = (y - 1)^2$

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

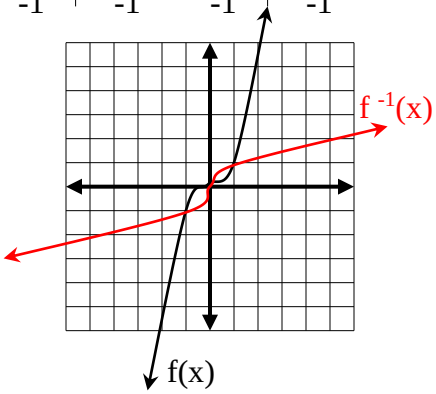
$f^{-1}(x) = \pm\sqrt{x+4} + 1$

since $x \leq 1$…

$f^{-1}(x) = -\sqrt{x+4} + 1$

14) $f(x) = x^3$

x	y	x	y
0	0	0	0
1	1	1	1
2	8	8	2
-1	-1	-1	-1



$x = y^3$

$f^{-1}(x) = \sqrt[3]{x}$

Prove (or disprove) that f(x) and g(x) are inverses of one another.

15) $f(x) = \frac{1}{x^3}$

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

<u>f(g(x))</u>

$= \frac{1}{(\sqrt[3]{x})^3}$

$= \frac{1}{x}$

$\neq$ x, not inverses

16) $f(x) = \frac{2}{3}x + \frac{1}{2}$

$g(x) = \frac{3}{2}x + \frac{3}{4}$

<u>f(g(x))</u>

$= \frac{2}{3}\left(\frac{3}{2}x + \frac{3}{4}\right) + \frac{1}{2}$

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

$= x + 1$

$\neq$ x, not inverses

17) $f(x) = \sqrt{6 - x}$

$g(x) = 6 - x^2$

<u>f(g(x))</u>

$= \sqrt{6 - (9 - x^2)}$

$= \sqrt{6 - 6 + x^2}$

$= \sqrt{x^2}$

$= \pm x$

$\neq$ x, not inverses