

## 1-7 Inverse Functions Practice

State if the given functions are inverses.

1)  $h(n) = -\frac{2}{n-1} - 2$

$f(n) = -\frac{3}{-n+3} - 2$

2)  $g(x) = \sqrt[5]{x} + 3$   
 $f(x) = (x-3)^5$

$$(f \circ g)(x) = (\sqrt[5]{x} + 3 - 3)^5$$
$$(\sqrt[5]{x})^5 = \boxed{x}$$

Yes!

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

$f(x) = \frac{-5x-25}{7}$

4)  $g(n) = 2n^3$   
 $f(n) = \sqrt[3]{\frac{n}{2}}$

$$(f \circ g)(x) = \sqrt[3]{\frac{2n^3}{2}}$$

$$(g \circ f)(x) = 2\left(\sqrt[3]{\frac{n}{2}}\right)^3$$
$$\frac{2n}{2} = \boxed{n}$$
$$\sqrt[3]{n^3} = \boxed{n}$$

Yes

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

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

No!

6)  $g(x) = \frac{6-x}{3}$   
 $f(x) = -3x + 6$

$$g(f(x)) = \frac{6 - (-3x + 6)}{3}$$

$$\frac{6 + 3x - 6}{3} = \frac{3x}{3} = \boxed{x}$$

Yes!

Find the inverse of each function.

7)  $g(x) = \frac{2}{x-1} + 2$

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

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

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

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

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

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

8)  $f(x) = \sqrt[3]{x+1} + 1$

9)  $g(n) = -2n + 1$

$$x = -2y + 1$$

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

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

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

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

11)  $g(n) = -2n - 3$

12)  $f(x) = -(x-2)^3$

$$\frac{x}{-1} = \frac{-(y-2)^3}{-1}$$

$$\sqrt[3]{-x} = \sqrt[3]{(y-2)^3}$$

$$\sqrt[3]{-x} = y-2$$

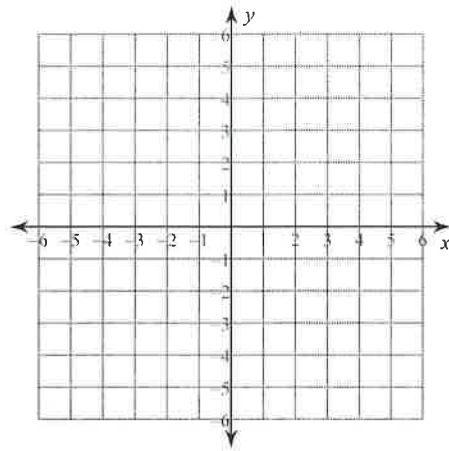
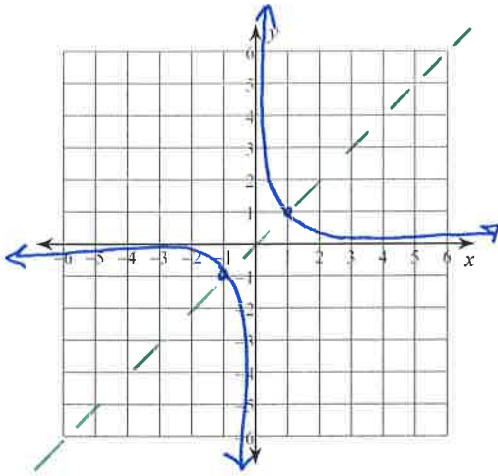
$$\sqrt[3]{-x} + 2 = y$$

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

Find the inverse of each function. Then graph the function and its inverse. Please sketch the mirror line on your graph using a dotted line.

13)  $g(x) = \frac{1}{x}$

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



$$g(x) = \frac{1}{x}$$
$$y \cdot x = \frac{1}{y} \cdot y$$

$$\frac{xy}{x} = \frac{1}{x}$$

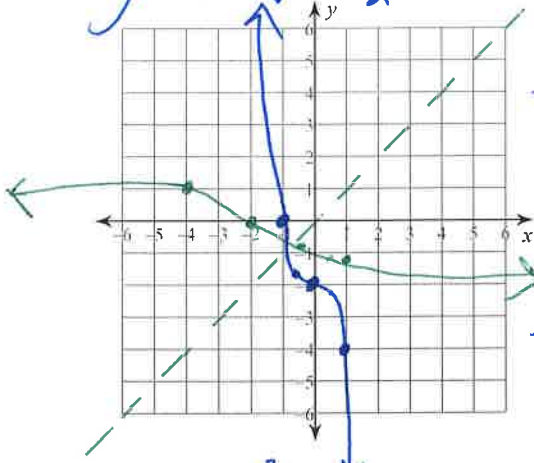
$$y = \frac{1}{x}$$

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

function is  
its own inverse

15)  $g(x) = -2 - 2x^3$

$g^{-1}(x) = \sqrt[3]{-\frac{x+2}{2}}$



$g(x)$

x	y
-1	0
0	-2
1	-4
2	-18
-0.5	-1.75
0.5	-2.25

$g^{-1}(x)$

x	y
-2	0
0	-1
1	-1.1
-4	1

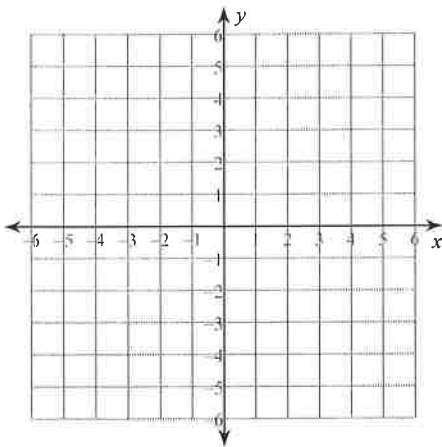
$x = -2 - 2y^3$

$x + 2 = -2y^3$

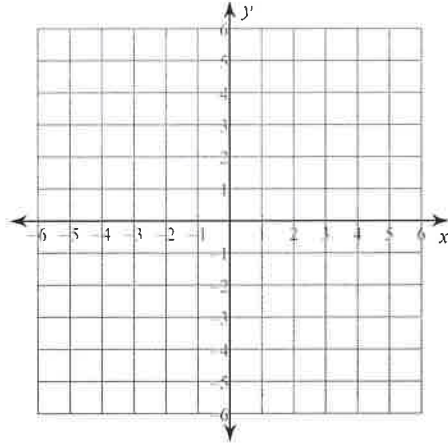
$y^3 = \frac{x+2}{-2}$

$y = \sqrt[3]{-\frac{x+2}{2}}$

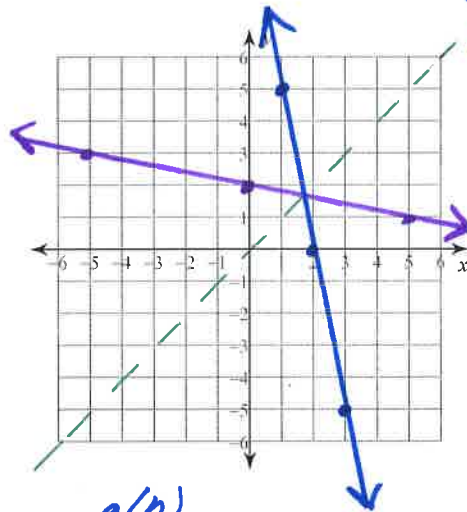
17)  $g(n) = \sqrt[3]{\frac{-n+2}{2}}$



16)  $g(n) = n + 3$



18)  $g(n) = -5n + 10$



$y = -5x + 10$   
 $x = -5y + 10$   
 $x - 10 = -5y$

$y = -\frac{1}{5}x + 2$

$g(n)$

x	y
-2	20
-1	15
0	10
1	5
2	0