HOMEWORK 3.3 – Inverse Functions

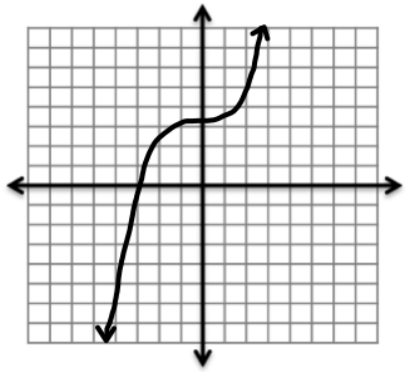
Name: _____ Date: _____ Period: _____

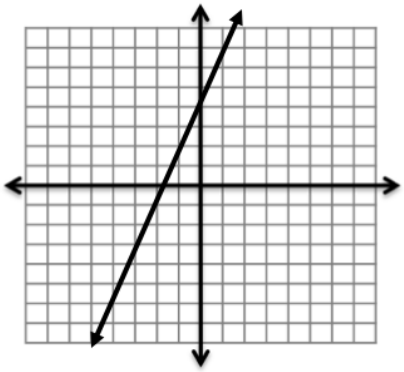
Find the inverse of each function. State whether the inverse is a function.

1. $\{(-1,0), (-2,1) (1,3) (3,4)\}$

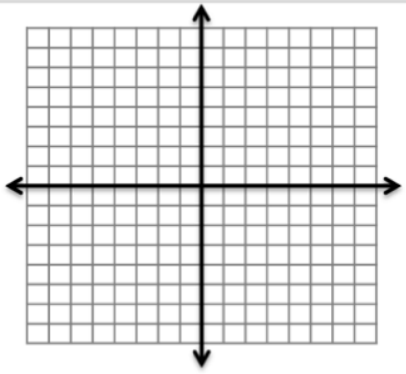
2.

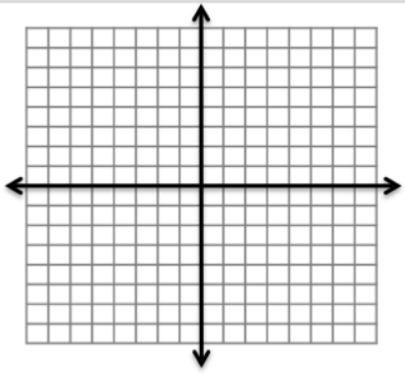
x	-6	-3	0	3	6
y	8	6	4	0	-2

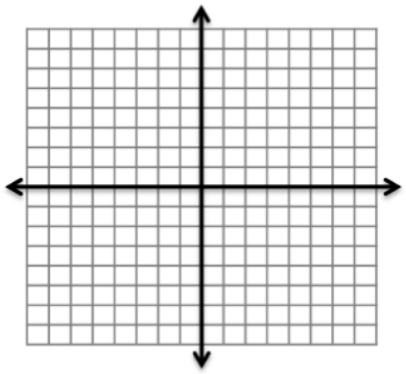
3. 

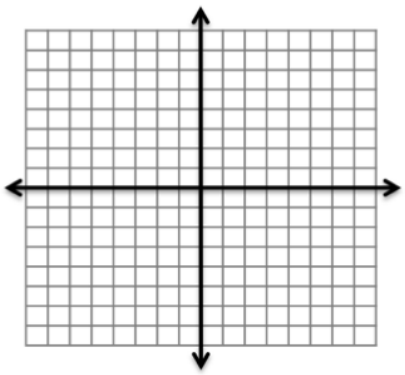
4. 

Graph each function, and use the horizontal line test (HLT) to determine whether the inverse is a function.

5. $f(x) = \frac{7-2x}{5}$ 

6. $f(x) = 2x^3$ 

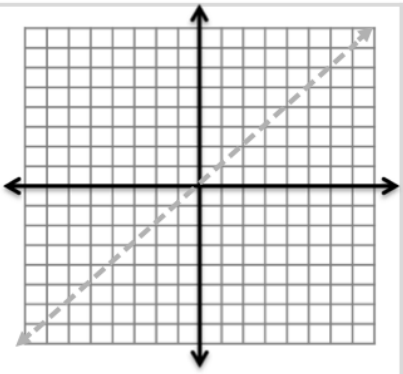
7. $f(x) = -x^2 + 2x$ 

8. $f(x) = 4$ 

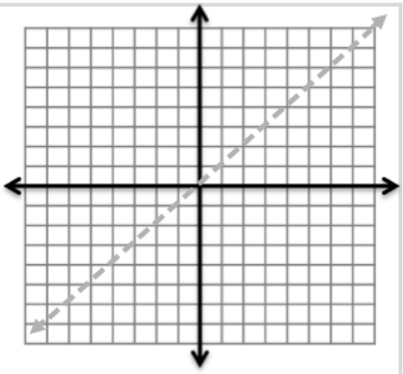
Complete the following steps for problems 9-12:

1) Find an equation based on the information given, and write it in function notation.
2) Find an equation for the inverse.
3) Sketch a graph of both functions.
4) Determine if the inverse is a function.
5) Then use composition to verify that the equation you wrote is the inverse: $f \circ g(x)$ *and* $g \circ f(x)$

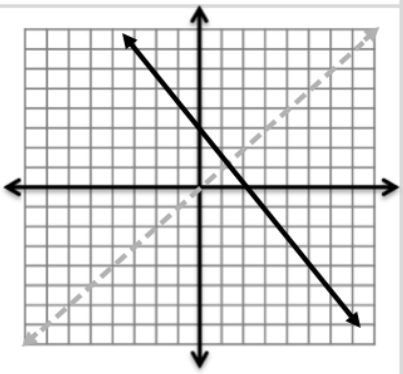
9. $y = \frac{x+8}{3}$



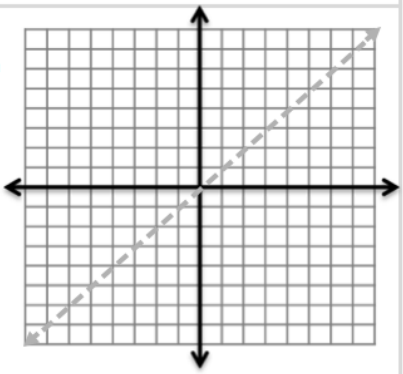
10. Slope: 5
Point: (-1, -4)



11.



12.
Points: (-8, -3) and (4, 0)



13. Evaluate at the given value: $g(x) = -2x + 7, \quad g^{-1}(-2)$

14. Evaluate at the given value: $g(x) = \frac{1}{7}x - 1, \quad g^{-1}(6)$

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Find the inverse of each function. State whether the inverse is a function.

1. $\{(-1,0), (-2,1) (1,3) (3,4)\}$

$\{(0,-1),(1,-2),(3,1),(4,3)\}$

Yes

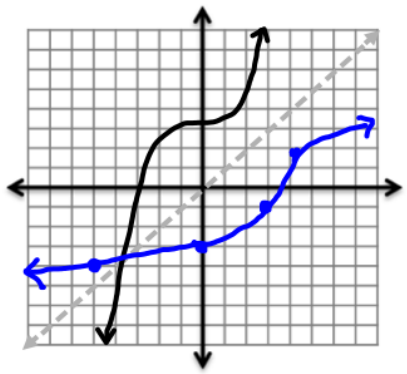
2.

x	-6	-3	0	3	6
y	8	6	4	0	-2

x	8	6	4	0	-2
y	-6	-3	0	3	6

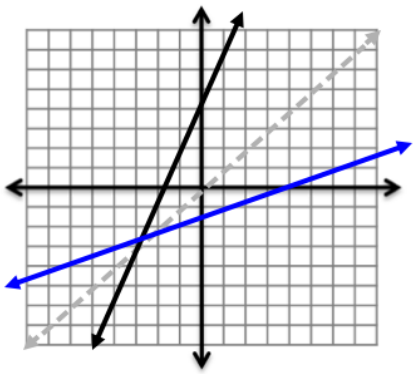
Yes

3.



Yes

4.

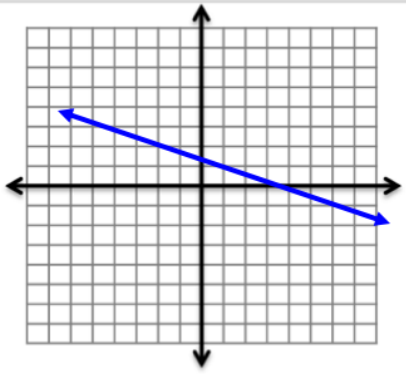


Yes

Graph each function, and use the horizontal line test (HLT) to determine whether the inverse is a function.

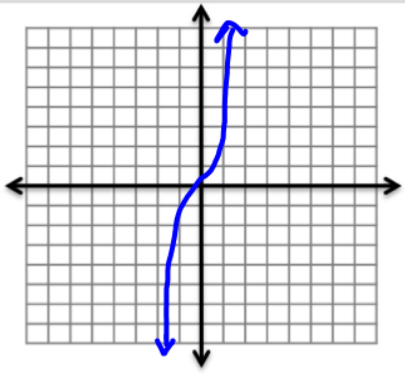
5. $f(x) = \frac{7-2x}{5}$

Yes



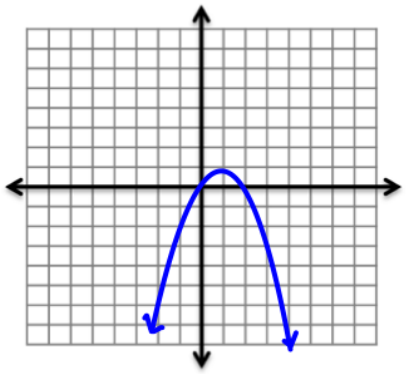
6. $f(x) = 2x^3$

Yes



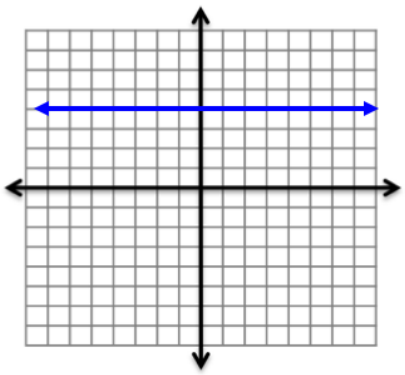
7. $f(x) = -x^2 + 2x$

No



8. $f(x) = 4$

No



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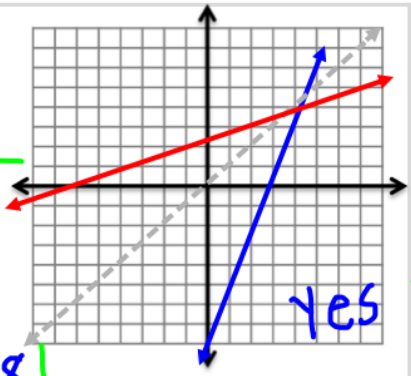
9. $y = \frac{x+8}{3}$



1 $f(x) = \frac{x+8}{3}$

$x = \frac{y+8}{3}$

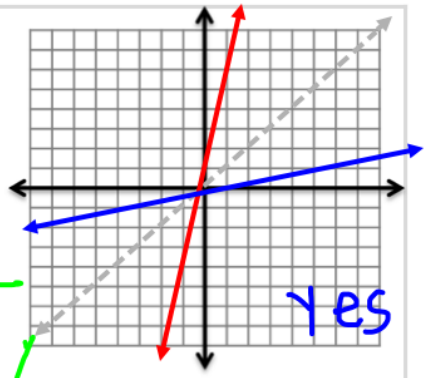
2 $3x = y + 8$

$g(x) = 3x - 8$

5 $f \circ g(x) = \frac{3x-8+8}{3} = x$

$g \circ f(x) = 3\left(\frac{x+8}{3}\right) - 8 = x + 8 - 8 = x$

10. Slope: 5
Point: (-1, -4)



1 $y + 4 = 5(x + 1)$

$y = 5x + 1$

$f(x) = 5x + 1$

2 $x = 5y + 1$

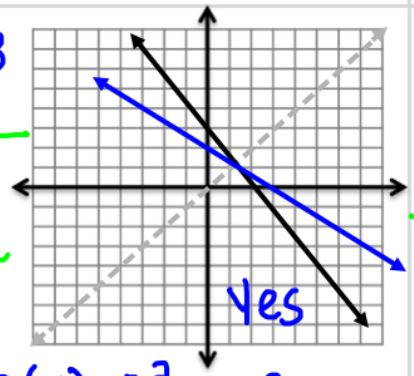
$5y = x - 1$

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

5 $f \circ g(x) = 5\left(\frac{1}{5}x - \frac{1}{5}\right) = x$

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

11. $f(x) = -\frac{3}{2}x + 3$



1 $x = -\frac{3}{2}y + 3$

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

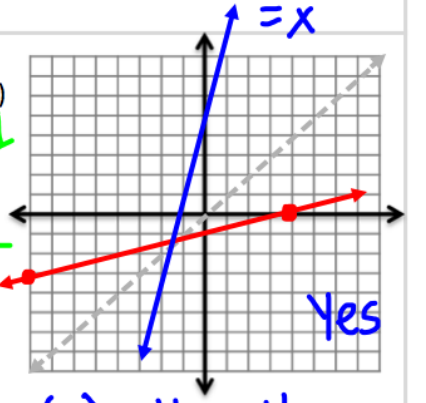
2 $y = -\frac{2}{3}x + 2$

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

5 $f \circ g(x) = -\frac{3}{2}\left(-\frac{2}{3}x + 2\right) + 3 = x - 3 + 3 = x$

$g \circ f(x) = -\frac{2}{3}\left(-\frac{3}{2}x + 3\right) + 2 = x - 2 + 2 = x$

12.
Points: (-8, -3) and (4, 0)



1 $f(x) = \frac{1}{4}x - 1$

2 $x = \frac{1}{4}y - 1$

$\frac{1}{4}y = x + 1$

$y = 4x + 4$

$g(x) = 4x + 4$

5 $f \circ g(x) = \frac{1}{4}(4x+4) - 1$

$x + 1 - 1 = x$

$g \circ f(x) = 4\left(\frac{1}{4}x - 1\right) + 4$

$= x - 4 + 4 = x$

13. Evaluate at the given value: $g(x) = -2x + 7, \quad g^{-1}(-2)$

$x = -2y + 7$

$-2y = x - 7$

$y = -\frac{1}{2}x + \frac{7}{2}$

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

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

$= 1 + \frac{7}{2} = 4.5$

14. Evaluate at the given value: $g(x) = \frac{1}{7}x - 1, \quad g^{-1}(6)$

$x = \frac{1}{7}y - 1$

$\frac{1}{7}y = x + 1$

$y = 7x + 7$

$g^{-1}(x) = 7x + 7$

$g^{-1}(6) = 7(6) + 7 = 49$