INVERSE FUNCTIONS AND RELATIONS

7-2

Find the inverse of each relation (given in coordinate form)

1) f = {(4, -7), (-9, 2), (0, 0), (-3, -8)} f^{-1} = {(-7, 4), (2, -9), (0, 0), (-8, -3)}

2) h = {(-0.7, 1.2), (10, 9), (14, 1.2)} h^{-1} = {(1.2, -0,7), (9, 10), (1.2, 14)}

**** brainiac time! Why are they asking you for an inverse ***relation*** and not an inverse ***function***?

h^{-1} is technically not a function since it has a duplicate x-coordinate (1.2) in its domain

pretzel man!

Write an inverse function for each function given. Keep in mind what you did with the coordinates earlier!!

4) y = 6 – 5x

switch the x & y, then solve for y

x = 6 – 5y

x – 6 = -5y

$-\frac{x}{5}+\frac{6}{5}=y$ or correct notation: $y^{-1}=-\frac{x}{5}+\frac{6}{5}$

5) $f(x)=\frac{2}{3}x+8$

$x=\frac{2}{3}y+8$

$x-8=\frac{2}{3}y$

$\frac{3}{2}x-12=y$ $f^{-1}(x)=\frac{3}{2}x-12$

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

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

3x = 2y – 4

3x + 4 = 2y

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

7) x = -3

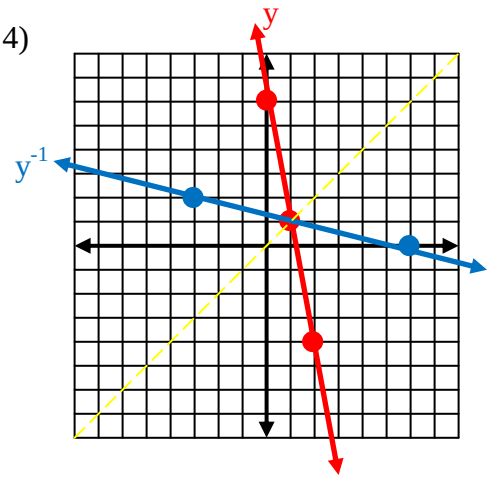
y = -3 done!

no need to write y^{-1} since there was no y in the original problem

Now graph 'em. Graph both the original function & the inverse function on the same grid. Make sure to label them both, and if need be include the line of symmetry.

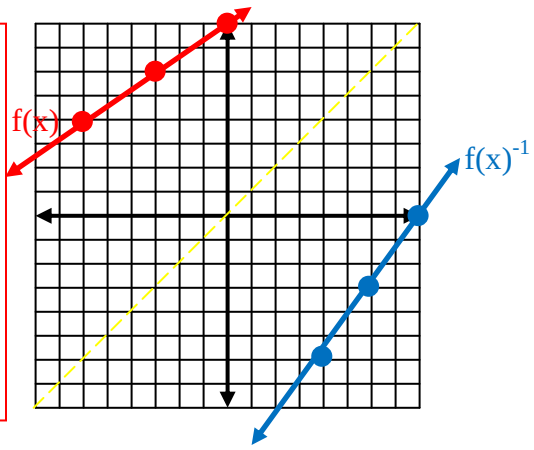
notice the line of symmetry in yellow

4)

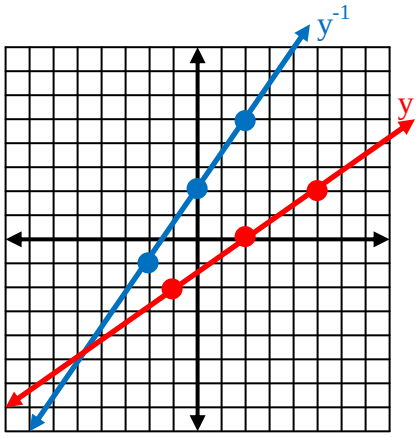


Use y = mx + b to graph the original equation. Then, flip flop the coordinates to get the inverse points. Example: (0, 6) becomes (6, 0)

5)

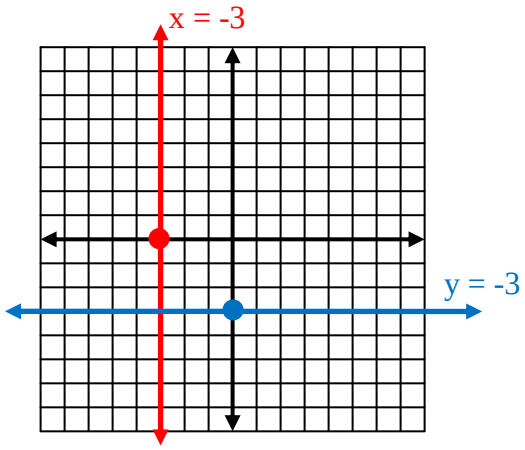


6)



In #6, I chose to graph the inverse graph first (g^{-1}) since it had a whole number y-intercpet, then I flipped the coordinates to get g(x)

7)



Determine if the following pairs of functions are inverses of one another.

8) $f(x) = \frac{3}{4}x - 6$

$g(x) = \frac{4}{3}x + 8$

f ◦ g

= 3/4(4/3x + 8) – 6
= x + 6 – 6
= x

g ◦ f

= 4/3(3/4x – 6) + 8
= x – 8 + 8
= x

f(x) and g(x) are inverses of one another since the composition of both functions resulted in "x".

Both results must = x (and nothing else) in order for the functions to be inverses.

9) $f(x) = 4x + \frac{1}{3}$

$g(x) = \frac{1}{4}x - 3$

f ◦ g

= 4(1/4x – 3) + 1/3
= x – 12 + 1/3
= x – 35/3

g ◦ f

Since the first composition did not "literally" equal "x", there is no need to compute the second one.

The answer is: No, f(x) and g(x) are not inverses.