

IB Math 1 Inverses

1. a. Complete the table for the inverse of this function.

x	$f(x)$
-2	5
3	7
-4	-8
2	-1
0	4

x	$f^{-1}(x)$
5	-2
7	3
-8	-4
-1	2
4	0

b. Find $f^{-1}(f(3))$

$$f^{-1}(7)$$

$$3$$

2. a. Find the inverse of $g(x) = 3x + 2$.

* swap x and y *

$$y = 3x + 2$$

$$x = 3y + 2$$

$$x - 2 = 3y$$

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

b. Is the inverse a function?

Yes

c. If yes, write the equation using inverse function notation and find $g(g^{-1}(x))$

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

" g inverse of x "

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

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

$$= x - 2 + 2$$

$$= x$$

$$\boxed{g(g^{-1}(x)) = x}$$

3. a. Find the inverse of $h(x) = x^2 - 4$.

$$y = x^2 - 4$$

$$x = y^2 - 4$$

$$x + 4 = y^2$$

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

b. Is the inverse a function?

No

c. If yes, write the equation using inverse function notation and find $h(h^{-1}(x))$

only use inverse function notation if the inverse is a function.

4. $f(x) = \frac{x+5}{2}$ and $g(x) = 2x-5$

a. Find $f(g(x))$.

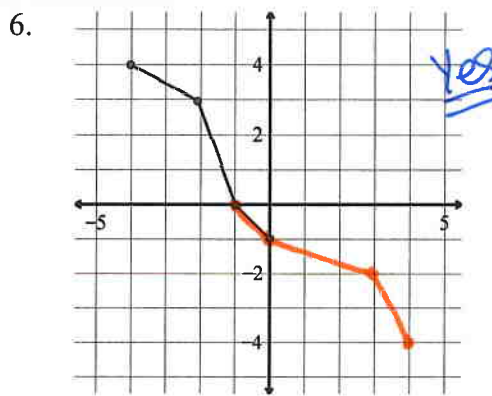
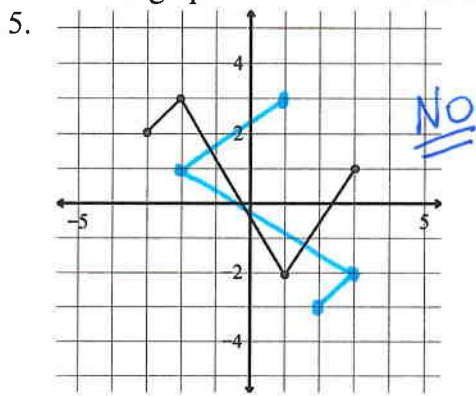
$$\begin{aligned} f(2x-5) &= \frac{(2x-5)+5}{2} \\ &= \frac{2x}{2} \\ &= x \end{aligned}$$

b. Are f and g inverses?

To know for sure, we must also check $g(f(x))$:

$$\begin{aligned} g(f(x)) &= g\left(\frac{x+5}{2}\right) \\ &= 2\left(\frac{x+5}{2}\right) - 5 \\ &= x+5-5 \\ &= x \end{aligned}$$

Sketch the graph of the inverse. Is the inverse a function?



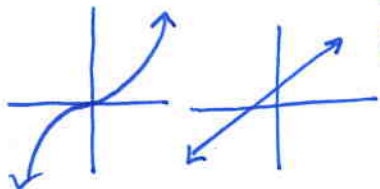
7. a. How can you tell by looking at the graph whether the inverse is a function?

Use the horizontal line test

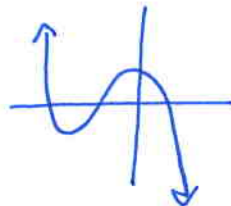
b. Draw an example of a **one-to-one function** and an example of a **many-to-one function**.

Which function has an inverse that is also a function? Which ones are relations?

one-to-one → inverse is a function (passes the horizontal line test)



many-to-one → inverse is not a function (fails horizontal line test)



8. Find the domain and range for the function in #6.

$$D: [-4, 0] \quad R: [-1, 4]$$

9. Find the domain and range for the inverse of the function in #6.

$$D: [-1, 4] \quad R: [-4, 0]$$

10. What is the relationship between the domain and range of a function and its inverse?

Swap domain & range

HW 2J (2-4, 7-10, 14, 16-19)