11/13 warm up

1. $f(x) = 3-4x$
   a) what are 3 pts on this line?
   b) what are 3 pts on the inverse?
   c) what is the inverse?

2. $g(x) = x^2 - 4$
   a) $g(1) = ?$
   b) $g^{-1}(12) = ?$
   c) what is two ways to solve (b)?
   d) $g(g^{-1}(x)) = ?$
   e) $g^{-1}(g(x)) = ?$
   f) what's wrong with part (b)

answers

1. a) (1, -1), (2, -5), (3, -9) answers will vary
   b) (-1, 1), (-5, 2), (-9, 3) based on answers for (a)
   c) $y = 3-4x$
   $x = 3-4y$
   $x-3 = -4y$
   $\frac{x-3}{-4} = f^{-1}(x)$

2. a) $g(1) = 1-4 = -3$
   b) $g^{-1}(x) = \pm\sqrt{x+4}$
   $g^{-1}(12) = \pm 4$
   OR $12 = x^2 - 4$
   $16 = x^2$
   $\pm 4 = x$.

c) you can find the inverse then plug in OR plug in 12 for y in the original.

d) $g(g^{-1}(x)) = (\sqrt{x+4})^2 - 4$
$= x+4-4$
$= x$

e) $g^{-1}(g(x)) = \sqrt{x^2-4+4} = \sqrt{x^2} = x$

f) should not have $g^{-1}(x)$ notation, not a function.

Notes 11/13

Solving for values in the inverse

- there are two ways to do this

ex $g(x) = 5 + 2x$, find $g^{-1}(3)$

way 1: find inverse & plug in

$$g^{-1}(x) = \frac{x-5}{2}$$

$$g^{-1}(3) = \frac{3-5}{2} = \frac{-2}{2} = -1$$

way 2: the x-value of $g^{-1}(x)$ is the y-value of $g(x)$ because they are inverses.

$3 = 5 + 2x$ set equal to original

$-5 \quad -5$

$-2 = 2x$

$-1 = x$ this is the y-value of $g^{-1}(x)$

so $\boxed{g^{-1}(3) = -1}$

important info

- if $f(x)$ & $f^{-1}(x)$ are inverses
  $f(f^{-1}(x)) = x$ & $f^{-1}(f(x)) = x$
- only add $\pm$ when using even roots ie $\sqrt{\ }$, $\sqrt[4]{\ }$, etc.
- only use f^{-1} notation if the inverse is a function