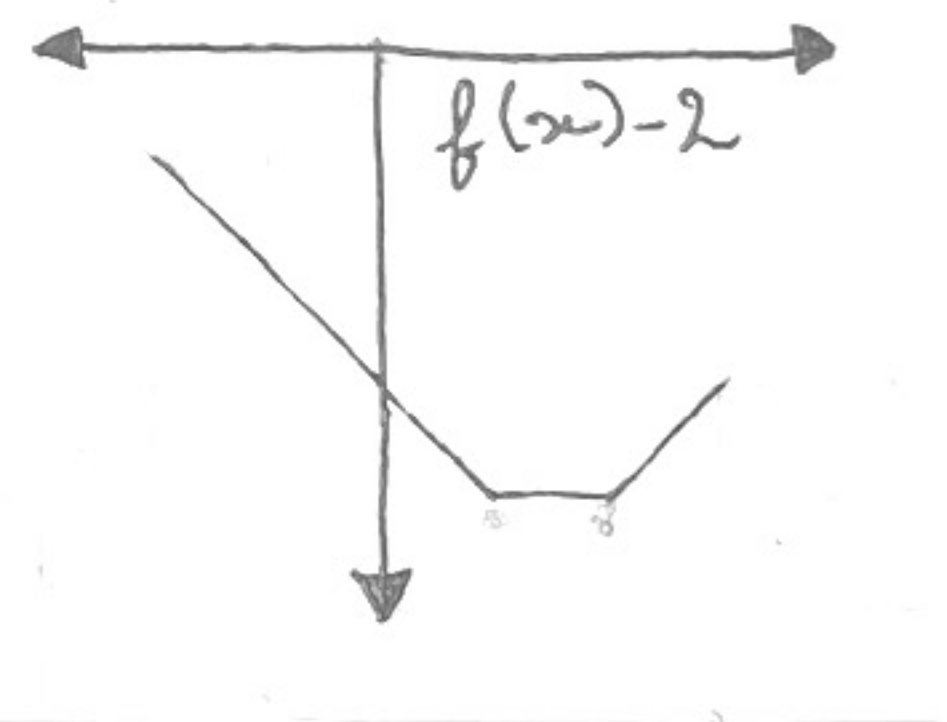
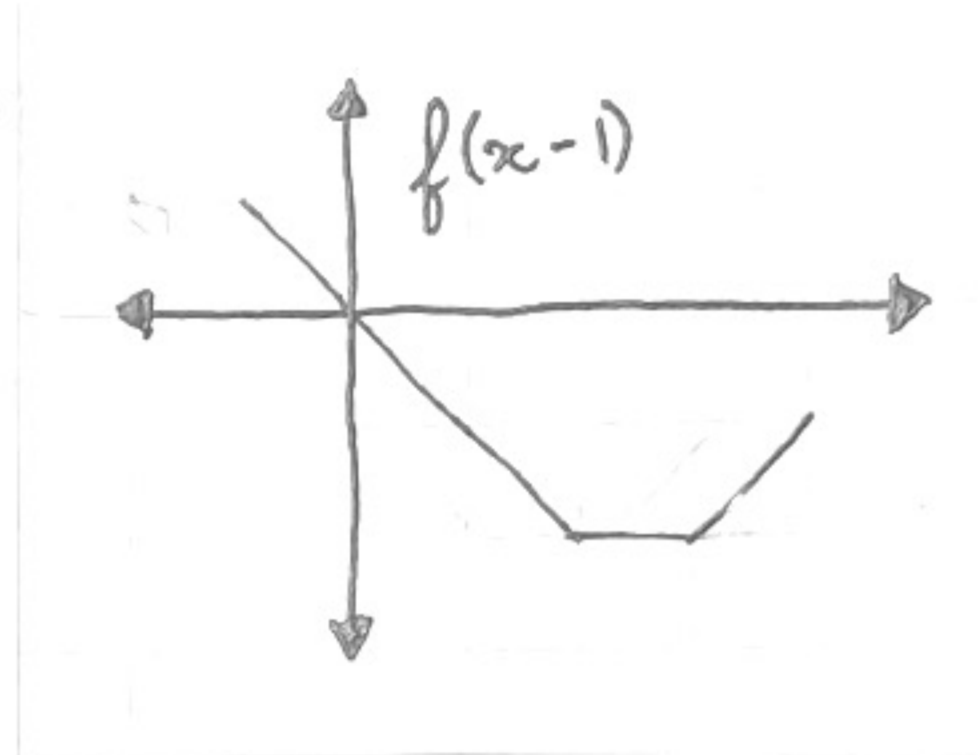
Keerthik M.
Calculus I
Hollingsworth
9-12-2020

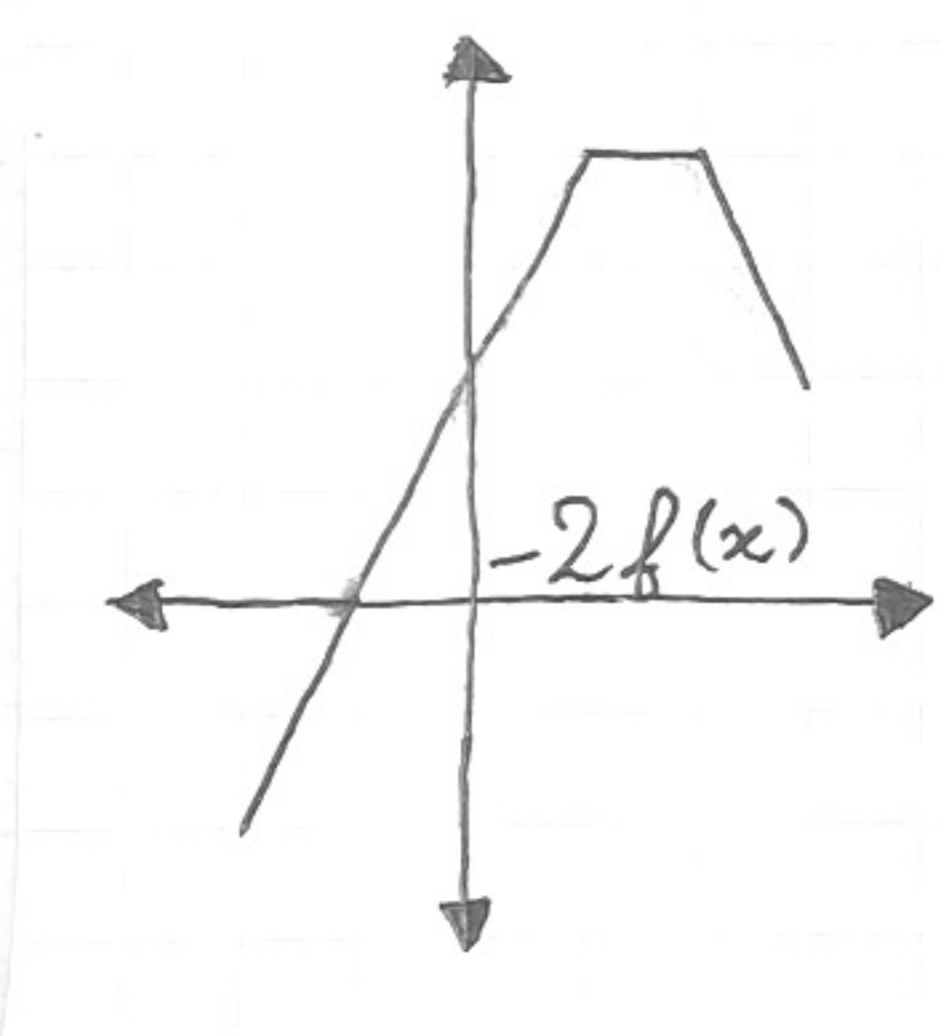
1.1 a.



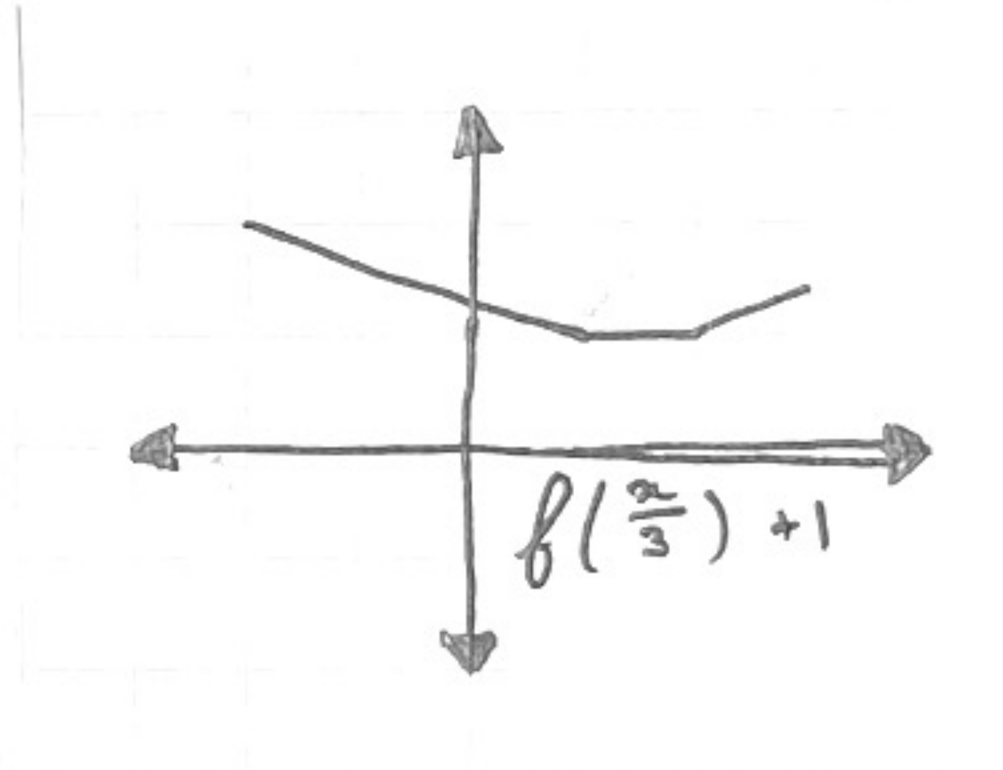
b.



c.



d.



1.2 $h(x)$ will not always be an odd function This is because if $f(x)$ is even, then $h(x)$ willbe too. If $f(g(x)) = h(x)$, then $f(g(-x)) = f(-g(x)) = f(g(x)) = h(x)$. However, if $f(x)$ is odd then $h(x)$ will be too, because the output will retain negatives

1.3 a. $f(x) = \sqrt{3+\ln x}$

$\ln(x) \geq -3$,

$x \geq e^{-3} = \frac{1}{e^3}$

Domain: $[e^{-3}, \infty)$

b. $f^{-1}(x) =$

$x = \sqrt{3+\ln y}$

$x^2 = 3 + \ln(y)$

$x^2 - 3 = \ln(y)$

$y = e^{x^2-3}$

$f^{-1}(x) = e^{x^2-3}$

Domain: $(-\infty, \infty)$

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Let $f(x)$ be a one-to-one function and c be a real number. State an expression for the inverse of $g(x)=f(x+c)$ in terms of f^{-1}, and prove that your formula is correct. Provide a figure that demonstrates the meaning of your formula.

My statement is that $g^{-1}(x)=f^{-1}(x)-c$

If I substitute x inside of $g(x)$ with $f^{-1}(x)-c$, I should get x because $g(g^{-1}(x))$ and $g^{-1}(x)=f^{-1}(x)-c$.

$$g(f^{-1}(x)-c) = \underset{g(x)=f(x+c)}{f}(f^{-1}(x)-c+c) = f(f^{-1}(x)) = x \checkmark$$

Thus $g^{-1}(x)=f^{-1}(x)-c$. Now we have to check for the other way around.

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

$\therefore$ My formula is correct in stating that $g^{-1}(x)=f^{-1}(x)-c$

If c is + =