Homework 1 feedback

18/20

1. Good!
2. (1/2) For (b), the fact that $g(x) = \sqrt[5]{\cos^{-1}(x)}$ has largest possible domain $[-1, 1]$ isn't the best explanation for why f isn't invertible. If we restricted the domain to $[0, 1]$ then there isn't really an issue; the bigger problem is that the image of g on the domain $[0, 1]$ is $[0, \sqrt[5]{\pi/2}] \approx [0, 1.09]$, which is much smaller than $[0, \pi/2]$. This means that for x between 1.10 and $\pi/2$, $g(f(x)) \neq x$, since $g(f(x))$ is always in $[0, \sqrt[5]{\pi/2}]$. (This is basically the same as observing that the graph of $f(x)$ does not pass the horizontal line test on the interval $[0, \pi/2]$.)
   Similar comments for (c).
3. Good!
4. Good!
5. Good!
6. Good!
7. Good!
8. Good!
9. (1/2) For (b), one can find a solution because for x very negative, $e^{2023x} - x$ is negative, but for x very positive $e^{2023x} - x$ is positive.
   There should be a better argument for (c) also using the intermediate value theorem...