Homework 3 feedback

20/20

- 1. Good!
- 2. Good!
- 3. In the same way that we can find the derivative of $\arctan(x)$ is $\frac{1}{1+x^2}$, we can find $\operatorname{arccot}(x)$ is $\frac{-1}{1+x^2}$. If we let $y = \operatorname{arccot}(x)$ then since $1+\cot^2 y = \csc^2 y$, we have that $\csc^2 y = \csc^2(\operatorname{arccot} x) = 1+x^2$.
- 4. Good!
- 5. Good!
- 6. Good!
- 7. Good! This is not necessary for this problem, but to see why a function with f''(x) > 0 and f(x) < 0 cannot exist, notice that a function that is concave up (everywhere) must always stay strictly above any of its tangent lines. However, basically any tangent line to the graph must eventually go above the x-axis, hence f must also eventually be above the x-axis.
- 8. Good!
- 9. Good!