HOMEWORK 7

1. Compute the first derivative of the following functions

i) $f(x) = 7^x + \log(3)$

ii) $f(x) = \arccos(e^{-x})$

iii) $f(x) = x^x$

iv) $f(x) = \log_7(x)$

v) $f(x) = \ln(\sin(e^{x^2}))$

vi) $f(x) = \ln(\sin(x) + \cos(x))$

vii) $f(x) = \arctan(x + x^3)$

viii) $f(x) = x^7 \arcsin(x^5)$

ix) $f(x) = \sin(\arctan(x))$

x) $f(x) = \ln(\arctan(x))$

2. Below is the graph of a function $f(x)$.
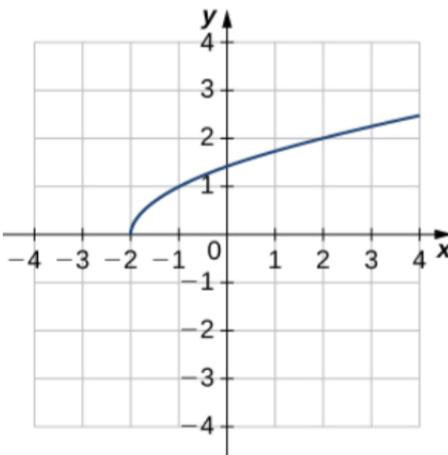
i) Draw the graph of its inverse.

ii) Use the graph to estimate the slope of the tangent line to the graph of the inverse function at $y = 1$.

3. Find the equation of the tangent line to the curve of equation $\arcsin(x) + \arcsin(y) = \frac{\pi}{6}$ at $y = \frac{1}{2}$.

4. Consider the function $f(x) = \frac{x^2 + x + 6}{x - 1}$.

i) Indicate at which points the function is not continuous.

ii) Compute $\lim_{x \to 1+} f(x)$ and $\lim_{x \to 1-} f(x)$.

iii) Find the intervals in which $f(x)$ is increasing.

iv) Find the points where the tangent line is horizontal.

v) Sketch the graph of $f(x)$.