There are two parts to this assignment. The first part is on WebWorK (accessible through Canvas). The second part consists of the questions on this page. You are expected to provide full solutions with complete justifications. You will be graded on the mathematical, logical and grammatical coherence of your solutions.

Your solutions must be typed, with your name and student number at the top of the first page. If your solutions are on multiple pages, the pages must be stapled together. Your written assignment must be handed in at the end of your recitation on Friday, November 23. The online assignment will close at 9:00am on Friday, November 23.

Problem 1. Find the point \((x_0, y_0)\) on the curve
\[
x^2 - y^2 + 1 = 0
\]
which is closest to \((4, 0)\). What is the minimal distance?

*Hint:* Express the square of the distance of \((4, 0)\) to an arbitrary point \((x, y)\) on the curve and find its minimum.

Problem 2. The arcsine function
\[
\arcsin : [-1, 1] \rightarrow \left[ -\frac{\pi}{2}, \frac{\pi}{2} \right]
\]
\[
x \mapsto \arcsin(x)
\]
is defined as the inverse of the sine function:
\[
\arcsin(\sin(x)) = x \quad \left( x \in \left[ -\frac{\pi}{2}, \frac{\pi}{2} \right] \right)
\]
\[
\sin(\arcsin(x)) = x \quad \left( x \in [-1, 1] \right)
\]

Prove that
\[
\frac{d}{dx} \arcsin(x) = \frac{1}{\sqrt{1 - x^2}}.
\]

*Hint:* Implicit differentiation.