MATH 202, Spring 2024 **Name:** _____
In class work 25 **Row and Seat**: _____

In class work **25** has questions **1** through **1** with a total of **8** points. Turn in your work at the end of class *on paper*. This assignment is due at *Thursday 2 May 13:20*.

"Perhaps my greatest wisdom is the knowledge that I do not know." JOHN STEINBECK[1]

1. Define a curve $\mathscr{C}$ parametrically as $\mathscr{C} = \begin{cases} x = \cosh(t) \\ y = \sinh(t) \end{cases}, t \in \mathbf{R}$.

2 (a) Ask Desmos to sketch $\mathscr{C}$ and reproduce the graph here.

2 (b) Show that if $(x, y) \in \mathscr{C}$, then $x^2 - y^2 = 1$.

[1] *Travels with Charley: In Search of America*

2 (c) Show that $(x = -1, y = 0) \notin \mathscr{C}$, but that $(x = -1, y = 0)$ is a point on the curve $x^2 - y^2 = 1$. **Hint:** Use the fact that range(cosh) $= [1, \infty)$.

2 (d) Express the arclength of the portion of $\mathscr{C}$ if the parameter space is $[-1, 1]$ as a definite integral. But do not attempt to use the FTC to find this value (unless you want to learn about elliptic integrals).