MATH 202, Spring 2024 **Name:** _____
In class work 24 **Row and Seat**: _____

In class work **24** has questions **1** through **1** with a total of **3** points. Turn in your work at the end of class *on paper*. This assignment is due at *Tuesday 23 April 13:20*.

"Piglet noticed that even though he had a very small heart, it could hold a rather large amount of gratitude." A. A. MILNE

1. Consider the parametrically defined curve $\mathscr{C} = \begin{cases} x = \frac{t}{1+t^2}, \\ y = \frac{4t^2}{1+t^2} \end{cases}, -\infty < t < \infty.$

1 (a) Use Desmos to draw this curve. Reproduce the curve as best you can on here:

1 (b) Is the point $(x = 0, y = 4)$ on the curve? The picture might indicate that it is, but is it really? To decide, you'll need to solve the equations

$$0 = \frac{t}{1+t^2}, \; 4 = \frac{4t^2}{1+t^2}.$$

1 (c) Substitute $\begin{cases} x = \frac{t}{1+t^2} \\ y = \frac{4t^2}{1+t^2} \end{cases}$ into $y^2 - 4y + 16x^2 = 0$. Explain why that shows that the curve $\mathscr{C}$ is a *portion* of an ellipse, but not the entire ellipse.