MTH 267, Quiz #1, Fall 2022 Name ____

Instructions: Show all work. Answers without work required to obtain the solution will not receive full credit. Some questions may contain multiple parts: be sure to answer all of them. Give exact answers unless specifically asked to estimate.

1. Differentiate the function $y = t^2 \ln(\cos 2t)$.

2. Integrate $\int \frac{t}{1-t} dt$.

3. Use technology to plot the direction field for the differential equation $\frac{dy}{dt} = y(y - 2t)$. Label and equilibria or nullclines. Include in your sketch sample trajectories of solutions in each region of the field.