1. Calculate the fluid force of a plate in the shape of the region shown in the figure below. The surface of the mystery fluid of density $\rho$ is at $y = 1$.

\[
\begin{align*}
\text{fluid level} & \quad y = \ln(x) \\
0 & \quad 1 \\
0 & \quad 1
\end{align*}
\]

2. Find parametric equations, $x(t)$ and $y(t)$, for the line segment from $(3, 2)$ to $(5, -2)$. Include the domain of $t$.

3. Find parametric equations, $x(t)$ and $y(t)$, for the circle with center $(1, -2)$ and radius 3. Include the domain of $t$.

4. We can change the ‘speed’ of a parametric curve by scaling the parameter. For example, replacing $t$ with $2t$ will increase the speed by a factor of two, i.e. the curve will be traced out twice as fast. We can change the direction a curve travels by similarly altering the parameter.

A cyloid generated by a circle of radius 1 has a parameterization given by

\[
x(t) = t - \sin(t), \quad y(t) = 1 - \cos t.
\]

Find a parameterization of a cycloid generated by a circle of radius 1 that goes ‘backwards.’