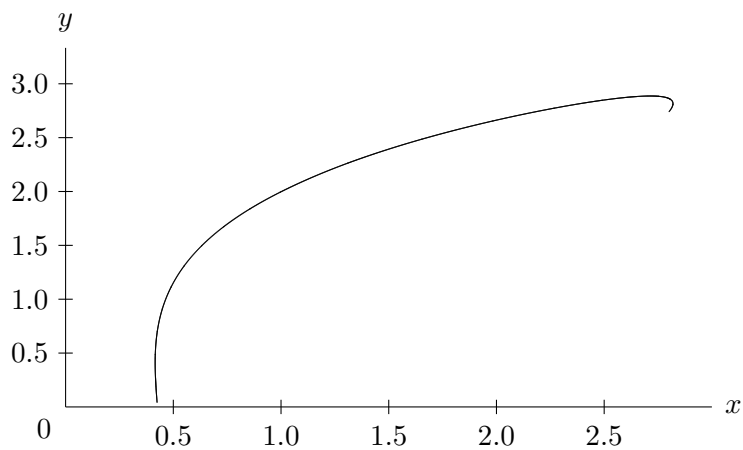


4. (6 points) A particle moves in the xy -plane so that it is at the position $(x(t), y(t))$ at time t , where $x(t)$ and $y(t)$ satisfy the system of differential equations

$$\frac{dx}{dt} = x^2 - y^2, \quad \frac{dy}{dt} = x - 2t.$$

It is known that at time $t = 2$, the particle is at the point $(1, 2)$. A graph of the path of the particle is shown in the figure.



Find the instantaneous velocity of the particle at time $t = 2$, and draw an arrow along the curve that shows the direction of motion. *Show your work.*