1. Find the general solution to this differential equation.

\[ y' = \frac{dy}{dt} = -t(y-2) \Rightarrow \int \frac{dy}{y-2} = \int -t \, dt \Rightarrow \ln |y-2| = -\frac{1}{2} t^2 + c \]

\[ \Rightarrow y-2 = Ae^{-\frac{1}{2} t^2} \Rightarrow y = 2 + Ae^{-\frac{1}{2} t^2} \]

2. On the slope field above, sketch the graphs of the three solutions to \( y' = t(2 - y) = -t(y - 2) \) that satisfy the given initial conditions

\[ y(0) = -1, \quad y(0) = 0, \quad y(0) = 1. \]
3. Match the differential equation with its slope field. Give reasons for your answer.

\[ y' = 2 - y \quad y' = x + y - 1 \quad y' = \sin(x) \sin(y) \]

\[ 0 = \sin(x) \sin(y) \]
\[ \Rightarrow \sin(x) = 0 \]
\[ \text{or} \]
\[ \sin(y) = 0 \]

So, \( x \) or \( y \) is \( \pm k\pi \)

Slope field I

\[ y' = 2 - y = 0 \]
\[ \Rightarrow y = 2 \]
\[ 0 \text{- isocline} \]

Slope field III

\[ y' = x + y - 1 = 0 \]
\[ \Rightarrow y = -x + 1 \]
\[ 0 \text{- isocline} \]

Slope field II

process of elimination