MA 114 Worksheet # 23: Graphical Methods

1. Match the differential equation with its slope field. Give reasons for your answer.

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

![Slope fields](image)

(a) Slope field I  
(b) Slope field II  
(c) Slope Field III  
(d) Slope field IV

Figure 1: Slope fields for Problem 1

2. Use slope field labeled IV to sketch the graphs of the solutions that satisfy the given initial conditions

\[ y(0) = -1, \quad y(0) = 0, \quad y(0) = 1. \]

3. Sketch the slope field of the differential equation. Then use it to sketch a solution curve that passes through the given point

(a) \( y' = y - 2x, \ (1, 0) \)  
(b) \( y' = xy - x^2, \ (0, 1) \)

4. Show that the isoclines of \( y' = t \) are vertical lines. Sketch the slope field for \(-2 \leq t \leq 2, \ -2 \leq y \leq 2\) and plot the integral curves passing through \((0, 1)\) and \((0, -1)\).