MA 114 Worksheet # 23: Graphical Methods

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

$$y' = 2 - y \qquad y' = x(2 - y) \qquad y' = x + y - 1 \qquad y' = \sin(x)\sin(y)$$

(a) Slope field I

(b) Slope field II

(c) Slope Field III
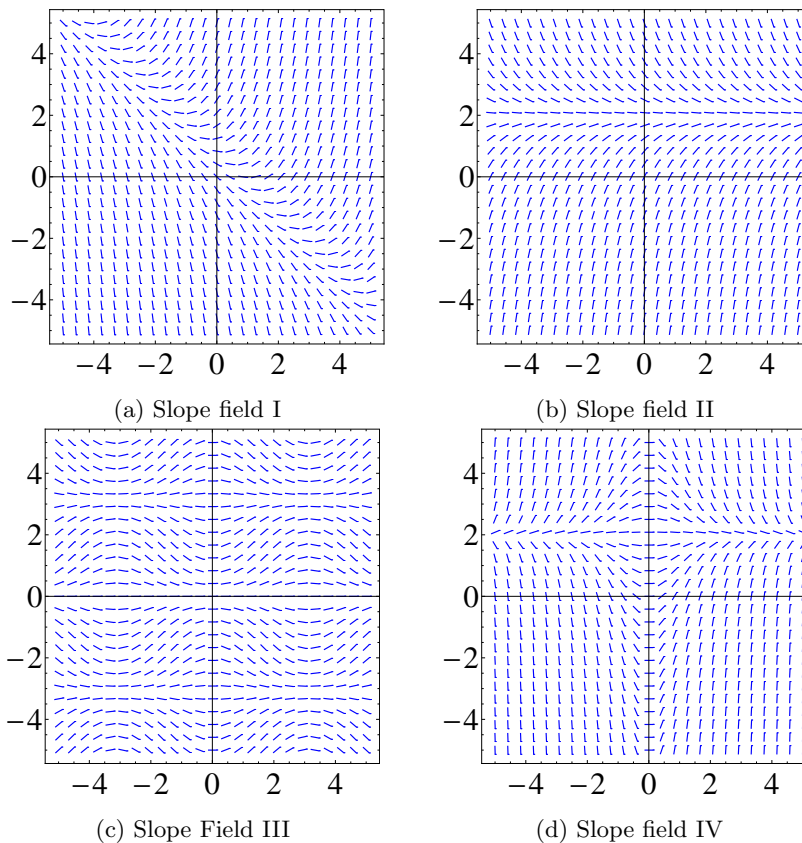
(d) Slope field IV

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 $-2 \le t \le 2$, $-2 \le y \le 2$ and plot the integral curves passing through $(0, 1)$ and $(0, -1)$.