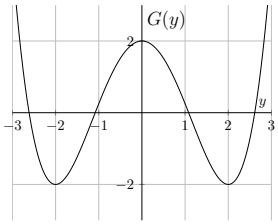
3. [11 points] The graph of $G(y)$ is shown below. Suppose that $G'(y) = g(y)$. Consider the differential equation $\dfrac{dy}{dt} = g(y)$.



Note again that $\frac{dy}{dt} = g(y)$ and the given graph depicts $G(y)$ **not** $g(y)$.

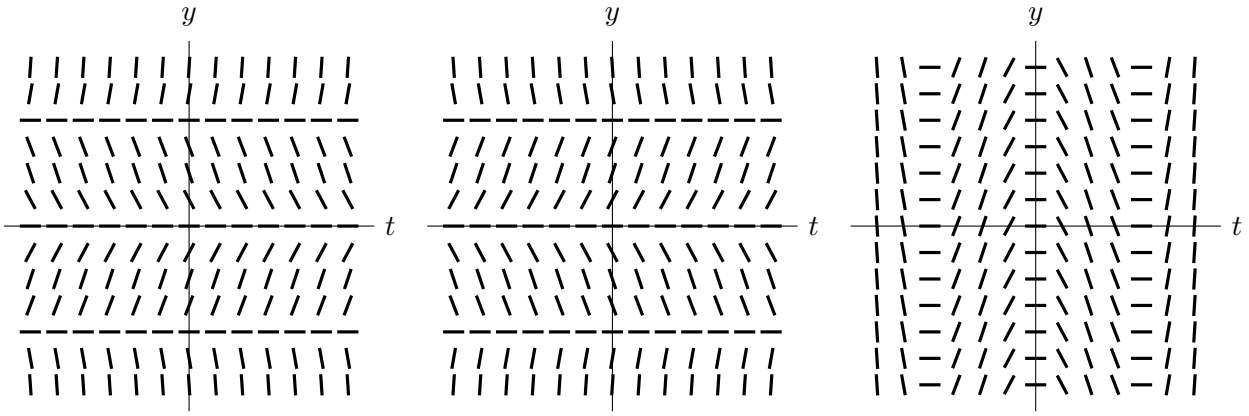
a. [6 points] The differential equation has 3 equilibrium solutions. Find the 3 solutions and indicate whether they are stable or unstable by circling the correct answer.

Equilibrium solution 1: -2 **Stable** **Unstable**

Equilibrium solution 2: 0 **Stable** **Unstable**

Equilibrium solution 3: 2 **Stable** **Unstable**

b. [2 points] Circle the graph that could be the slope field of the above differential equation.



I II III

c. [3 points] Suppose $y_1(t), y_2(t)$ and $y_3(t)$ are all solutions of the differential equation with different initial conditions as indicated below:

- $y_1(t)$ solves the differential equation with initial condition $y(0) = -2$.
- $y_2(t)$ solves the differential equation with initial condition $y(0) = 1.5$.
- $y_3(t)$ solves the differential equation with initial condition $y(0) = -2.1$.

Compute the following limits:

$\lim_{t\to\infty} y_1(t) = -2$ $\lim_{t\to\infty} y_2(t) = 0$ $\lim_{t\to\infty} y_3(t) = -\infty$ or DNE