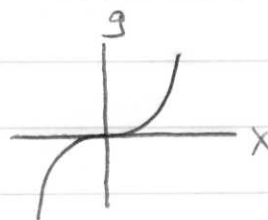
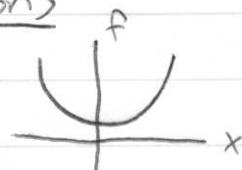


Relevant to Present HW: Even vs. odd Functions

by definition: even function - $f(-x) = f(x)$
odd function - $g(-x) = -g(x)$



→ implications for ODEs?

ex $\frac{dy}{dx} = x^3$ (odd) → $y(x) = \frac{1}{4}x^4 + C$ (even)

ex $\frac{dy}{dx} = x^2$ (even) → $y(x) = \frac{1}{3}x^3 + C \cdot x^0$ (could be odd!)

$$\frac{dy}{dx} = h(x) \rightarrow y = f(x) = \int h(x) dx$$

Slope Fields

- shows all solutions
- shows behavior changes w/ respect to independent variable
- picking any point in the 'plane' leads to a unique solution (i.e. solution curves don't cross)
 - Exist. + Uniqueness Theorem
- 'solution curve' represent the computer numerically integrating the ODE → Euler's Method

→ what does ODE tell us?

$$\frac{dy}{dx} = f(x, y)$$

→ slopes!

→ slope field just visualizes this

→ numerically integrate to get a solution

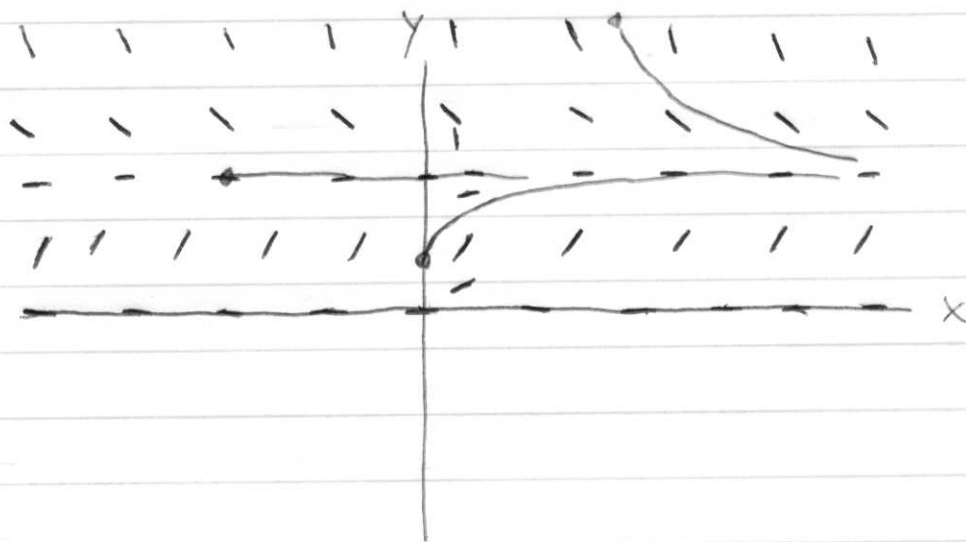
BONUS: equilib. + stability readily apparent

ex Logistic Eqn.

$$\frac{dy}{dx} = ay(b-y) \quad \rightarrow \quad y(x) = \frac{bA}{(A + e^{-abx})}$$

$(a, b > 0)$

slope field for $a=b=1$: $\frac{dy}{dx} = y(1-y)$



isoclines - line where the slope is identical
(for autonomous ODEs, just horizontal lines)