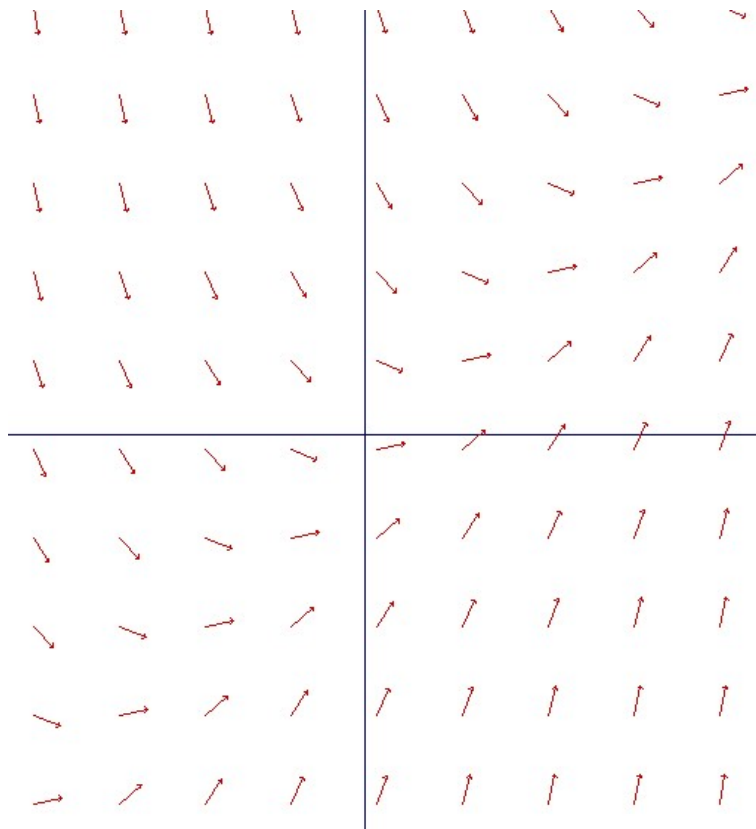


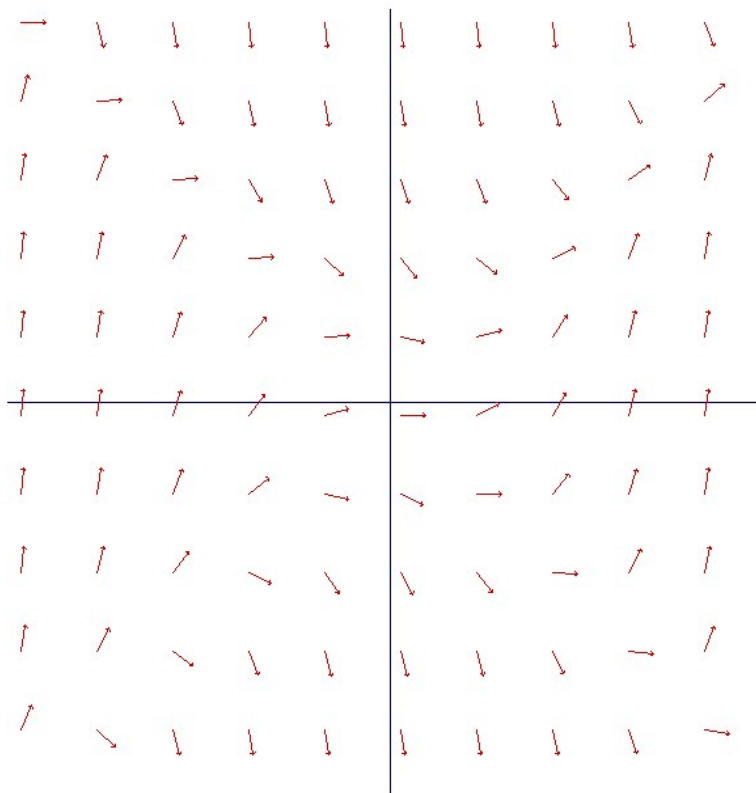
Math 217-001 201810
Practice Assignment # 2

1. *in the graph, $-3 < x < 3$ and $-3 < y < 3$)* This is the graph of the direction field of a certain equation $y' = f(x, y)$.



- (a) Draw an approximate solution y with $y(0) = 1$.
- (b) Draw an approximate solution y with $y(1) = 0$.
- (c) Draw an approximate solution y with $y(0) = -1$.
- (d) Is it possible that $f(x, y) = y^2$?
- (e) Is it possible that $f(x, y) = x^2 + y^2$?

2. in the graph, $-3 < x < 3$ and $-3 < y < 3$) This is the graph of the direction field of a certain equation $y' = f(x, y)$.



- (a) Draw an approximate solution y with $y(0) = 1$.
- (b) Draw an approximate solution y with $y(1) = 0$.
- (c) Draw an approximate solution y with $y(0) = -1$.
- (d) Is it possible that $f(x, y) = y^2$?
- (e) Is it possible that $f(x, y) = x^2 + y^2$?
3. For the equation $y' = y - y^3$:
- (a) Find the critical points;
- (b) decide if each critical point is semistable, attractor, or repeller;
- (c) draw possible solutions in each region as determined by the critical points.

4. Consider the initial value problem $y' = y/x^2$, $y(1) = -1/2$. Use Euler's method with $h = .1$ to approximate $y(2)$. Solve the separable equation to obtain y explicitly and compare with the value obtained.