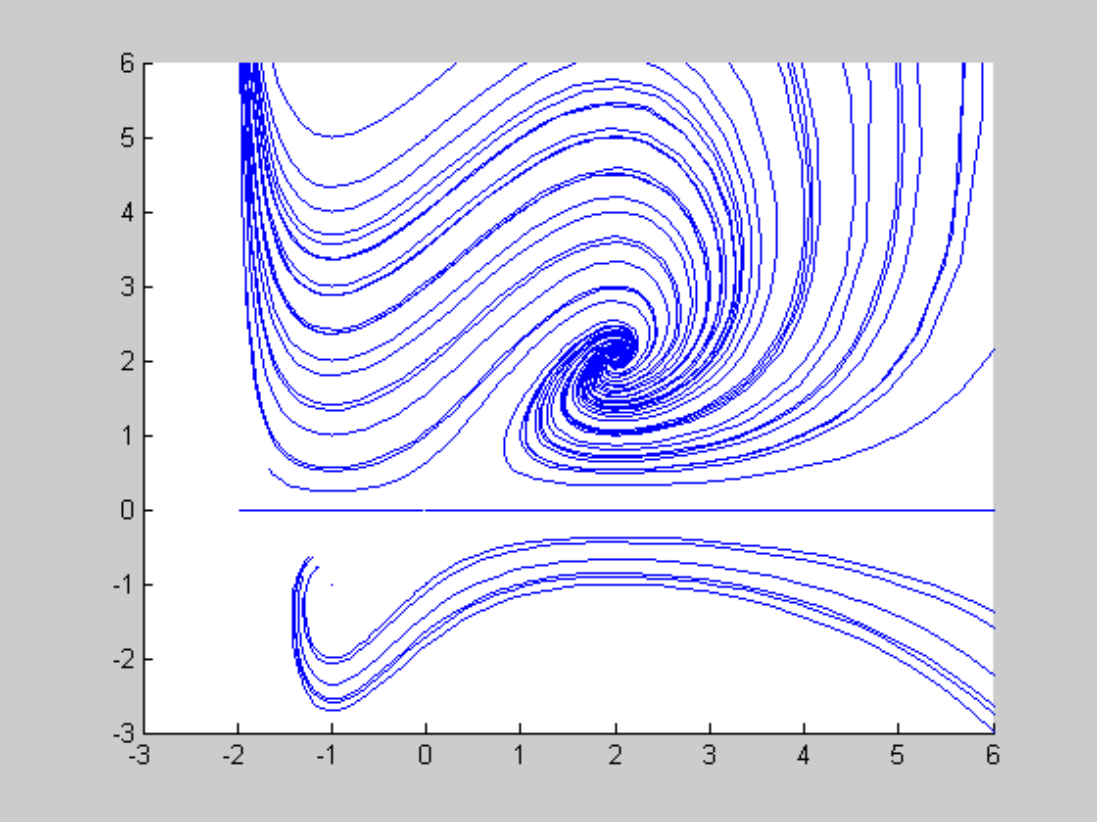
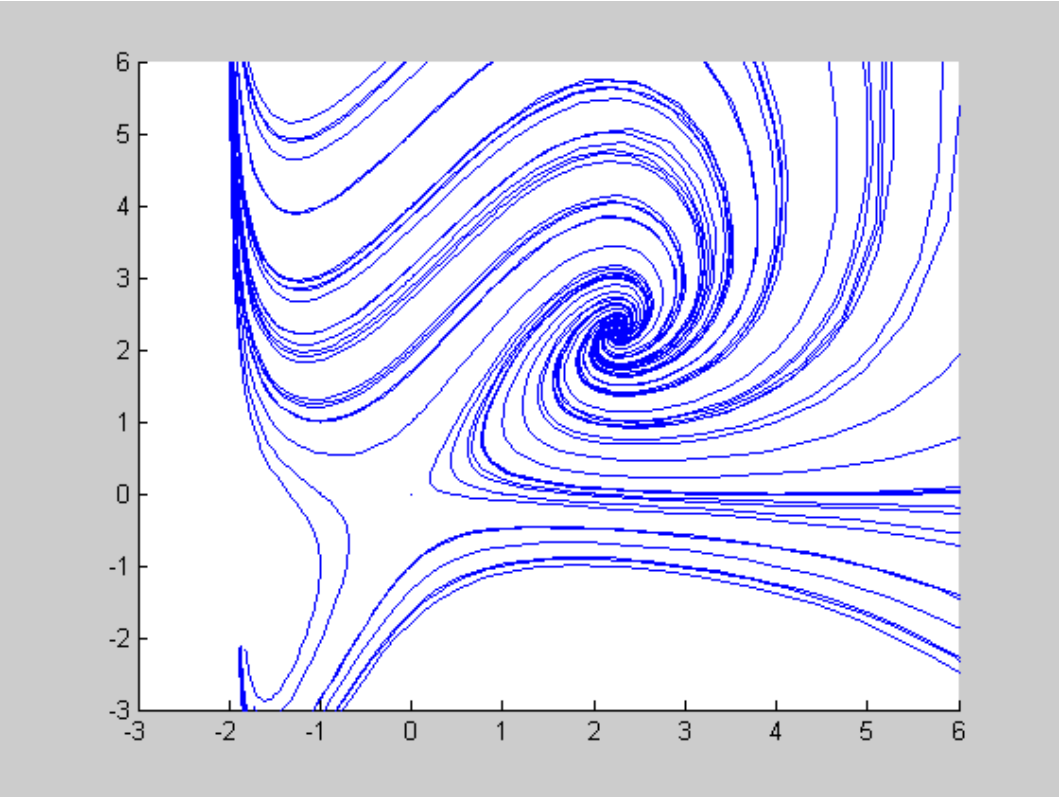
Corinne Resch
9.2 10 & 13

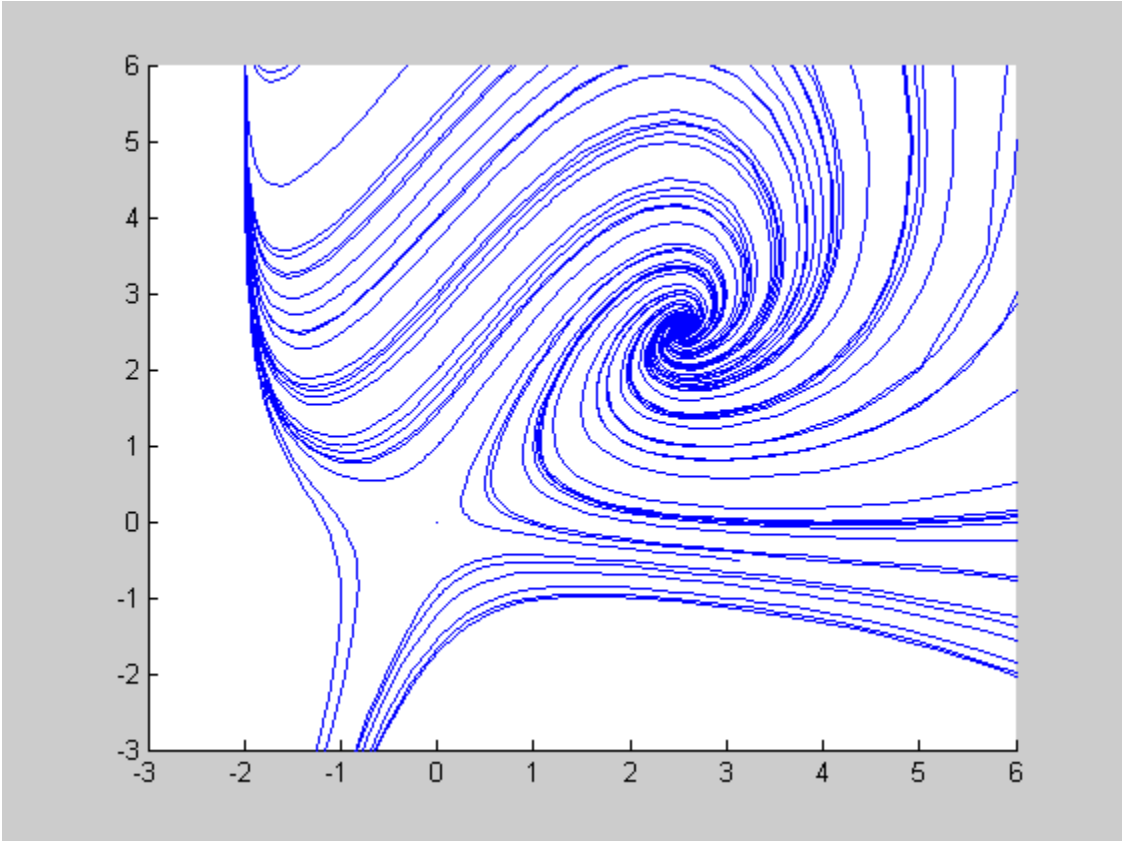
```
warning off all

for g=0:0.2:1

    figure; hold on

    axis tight

    f=@(t,x) [((2 + x(1))*(x(2) - x(1))); (1-g)*x(2)*(2+x(1)-(x(1))^2)+(g*(4-
x(1))*((x(2)+x(1))))];

    for a=-1:5

        for b=-1:5

            [t,xa] = ode45(f,[0 2],[a, b]);

            plot (xa(:,1),xa(:,2))

            [t,xa] = ode45(f,[0 -2],[a b]);

            plot(xa(:,1),xa(:,2))

        end

            axis([-3 6 -3 6])

    end

end
```



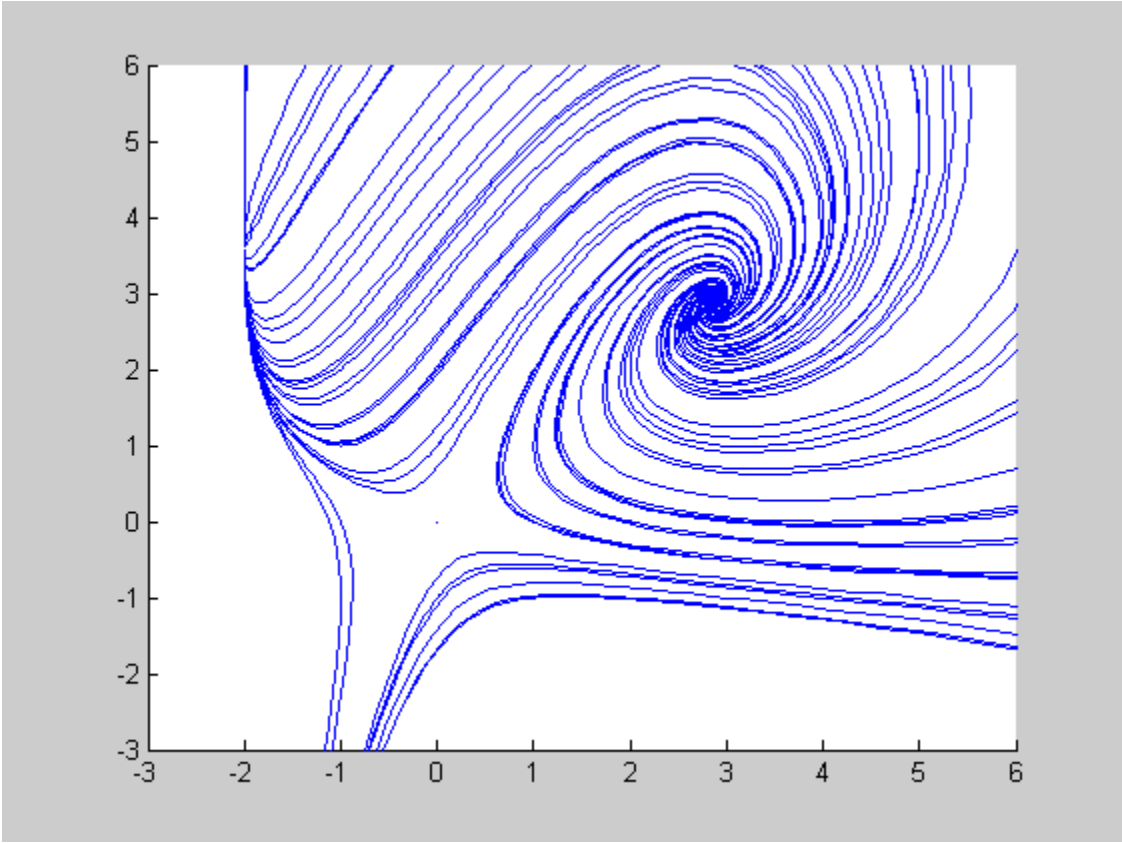
This function is a clockwise spiral with a critical point at (2, 2).



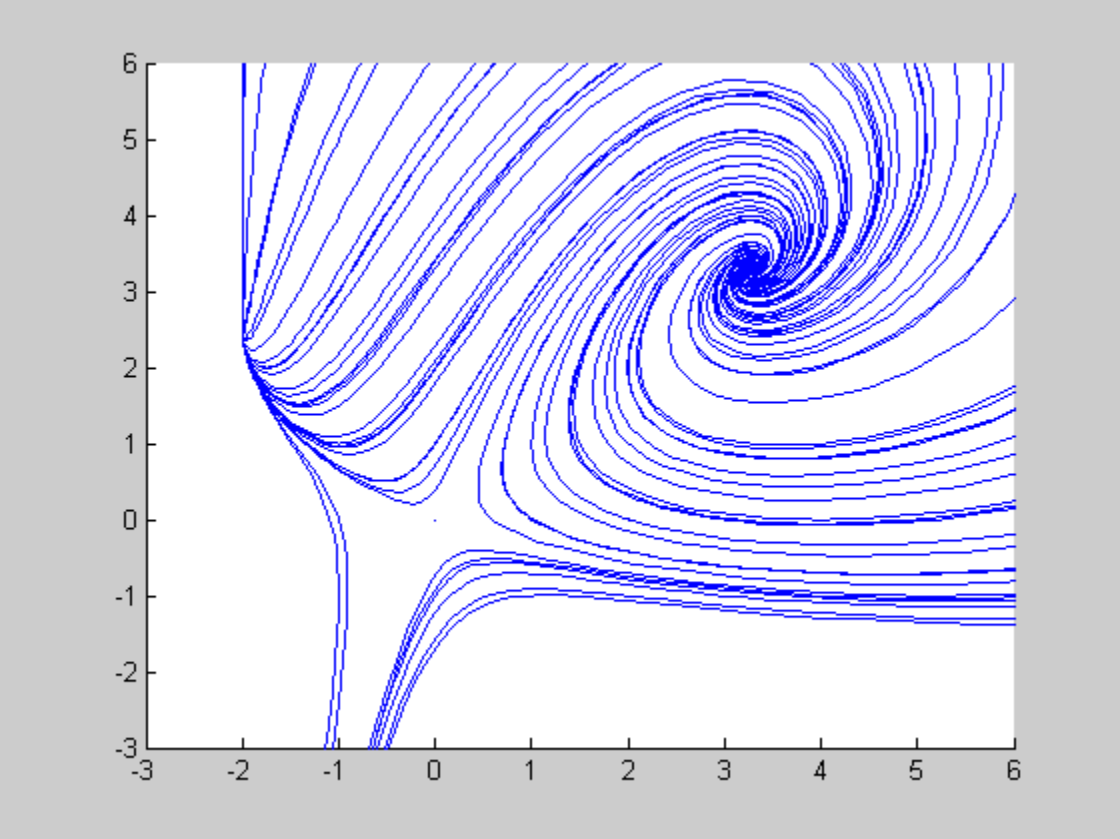
The function continues to be a spiral as ‘g’ increases however it changes the graph. The spiral has moved to about (2.5, 2.5) and there is another critical point at (0,0) which represents as saddle which is unstable.



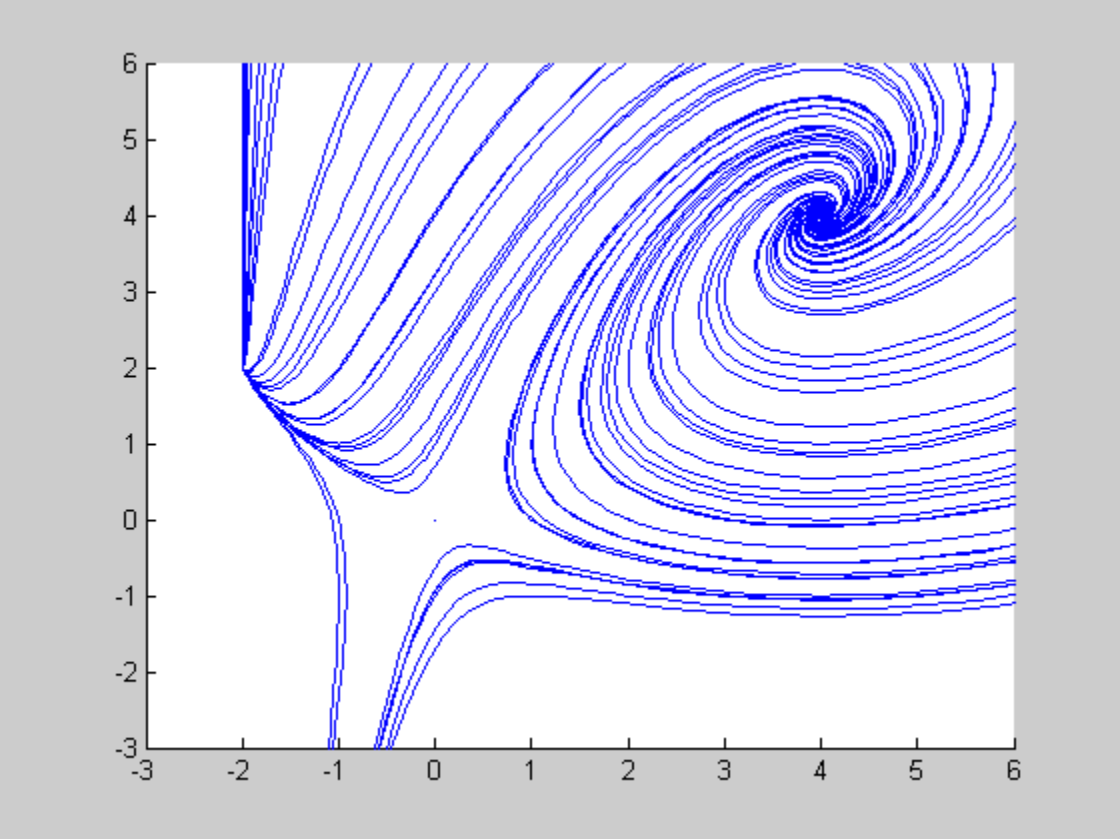
In this graph the function still has a clockwise spiral as ‘g’ increases however the location of that critical point has moved close to (3, 3)from (2.5, 2.5) on the graph. The critical point at (0,0) still represents a saddle which is unstable.



In this next graph the critical point which is represented by a clockwise spiral has moved to (3, 3) and the critical point which is represented by an unstable saddle remains at (0,0).



The clockwise spiral has moved to about (3.5, 3.5) on the graph. The saddle at (0, 0) remains unchanged.



This last graph looks very different from the first graph. As ‘g’ has increased the clockwise spiral has moved to about (4, 4) and the unstable saddle at (0, 0) remains in the same place.