```matlab
% Name (first and last)
% CSC 2262
% cs2262xx
% Sample 5a
k = .0547;
t = 0:.001:4;
w0 = 3;
f = @(t,w) sqrt(2*t^2+3*t+16) * log(sqrt(5*t^2+120)) - k*w^2;
options = odeset('RelTol',1e-7,'AbsTol',1e-7);
[t  w] = ode45(f,t,w0,options);
plot(t,w,'b');
axis([0  4  2  20]);
set(gca,'xtick',0:4);
set(gca,'ytick',2:2:20);
xlabel('t');
ylabel('omega');
title('Sample 5a');
```