%% Data

Tp=[-1.6,7.6,15.4,26.1,42.2,60.6]; % Degrees Celsius

VP=[20,40,60,100,200,400]; %% mm Hg

T=25; % Degrees Celsius

%% Part a

slope=(100-60)/(26.1-15.4);

lvp=@(T) slope\*(T-15.4)+60;

linear\_vp25=lvp(25);

fprintf('Using linear interpolation, the vapor pressure at %2.0f degrees Celsius is: %3.3f mm Hg\n', T, linear\_vp25);

%% Part B

A=[1, Tp(3), Tp(3)^2;...

1, Tp(4), Tp(4)^2;...

1, Tp(5), Tp(5)^2];

b=[VP(3);VP(4);VP(5)];

qinter\_constants=A\b;

a=qinter\_constants(1); b=qinter\_constants(2); c=qinter\_constants(3);

quadratic\_vp25=a+b\*T+c\*T^2;

fprintf('Using quadratic interpolation, the vapor pressure at %2.0f degrees Celsius is: %3.3f mm Hg\n', T, quadratic\_vp25);

%% Part C

spline\_vp25=spline(Tp,VP,T);

fprintf('Using spline interpolation, the vapor pressure at %2.0f degrees Celsius is: %3.3f mm Hg\n', T, spline\_vp25);

Using linear interpolation, the vapor pressure at 25 degrees Celsius is: 95.888 mm Hg

Using quadratic interpolation, the vapor pressure at 25 degrees Celsius is: 94.913 mm Hg

Using spline interpolation, the vapor pressure at 25 degrees Celsius is: 95.064 mm Hg

%% Initializing Data

PS=[10,15,20,25,30,35];

IoR=[1.3479,1.3557,1.3639,1.3723,1.3811,1.3902];

Sol\_PS=spline(IoR,PS,1.3606);

fprintf('At an index of refraction of 1.3606, the composition is %2.2f percent sucrose\n', Sol\_PS)

At an index of refraction of 1.3606, the composition is 18.01 percent sucrose

%% Initializing Data

T=100:100:1500;

Cp=[40.06,43.48,46.41,48.9,50.99,52.73,54.15,55.32,56.26,57.03,57.67,58.23,58.75,59.27,59.84];

%% Part A

Tint=trapz(T,Cp);

fprintf('Using TrapezoidsThe change in enthalpy from 100 Degrees Celsius to 1500 degrees Celsius is %5.0f J/gmol\n', Tint)

%% Part B

Sint=0;

for i=1:length(T)

if i==1

Sint=Sint+Cp(i);

elseif i==length(T)

Sint=Sint+Cp(i);

elseif mod(i,2)==0

Sint=Sint+4\*Cp(i);

else

Sint=Sint+2\*Cp(i);

end

end

fprintf('Using Simpsons Rule, The change in enthalpy from 100 Degrees Celsius to 1500 degrees Celsius is %5.0f J/gmol\n', Sint\*100/3)

Using TrapezoidsThe change in enthalpy from 100 Degrees Celsius to 1500 degrees Celsius is 74914 J/gmol

Using Simpsons Rule, The change in enthalpy from 100 Degrees Celsius to 1500 degrees Celsius is 74940 J/gmol