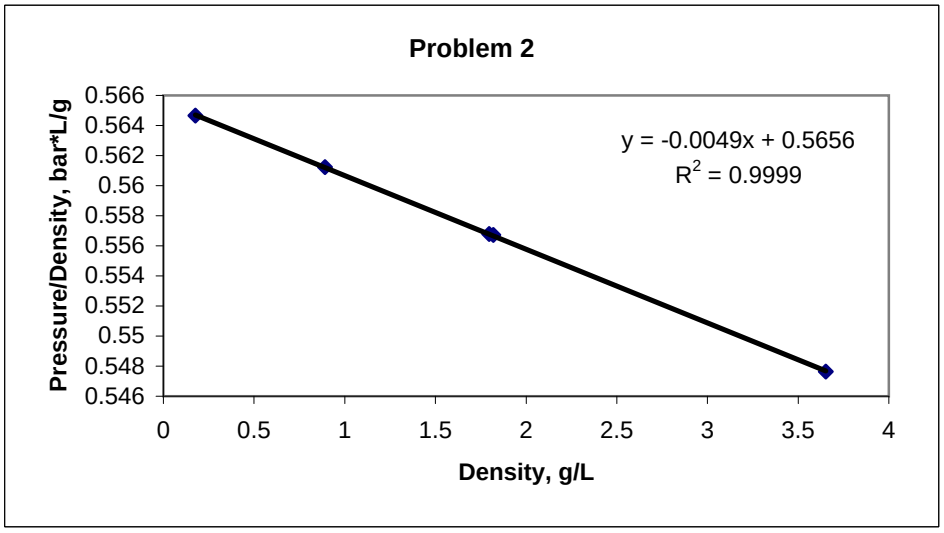
Problem 2

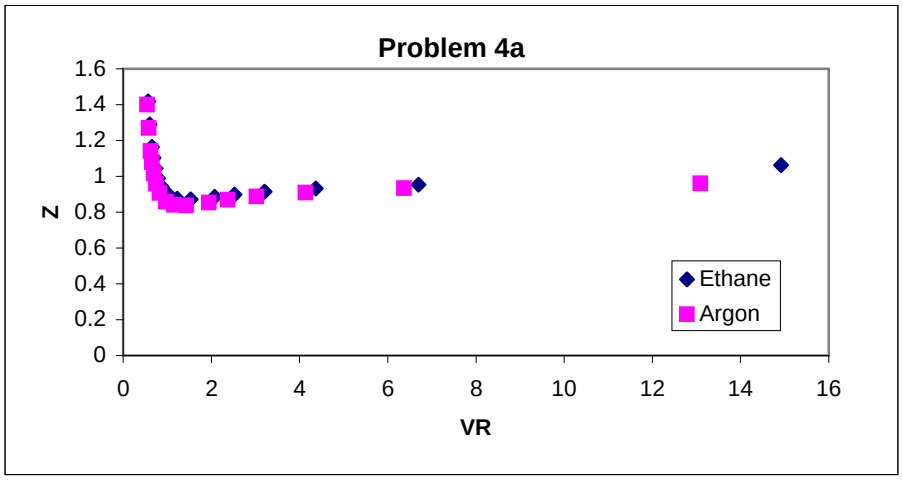
P (bar)	ρ (g/L)	P/ρ (bar*L/g)	
0.1	0.1771	0.564652739	M=RT/b
0.5	0.8909	0.561230217	b=0.5656
1	1.796	0.556792873	M=44.1 g/mol
1.01325	1.82	0.556730769	
2	3.652	0.547645126	



Problem 4, Page 1

Ethane T=500 K Vc=0.1480 TR=1.64 Pc=48.714 bar

P (bar)	V (L/mol)	V_R	Z, IG	Z, VDW	Z, RK	PR
0.5	83.076	561.3243	0.99917	0.999372	0.999376	0.010264
2	20.723	140.0203	0.996957	0.997487	0.997507	0.041056
10	4.105	27.73649	0.987432	0.987432	0.98765	0.20528
20	2.208	14.91892	1.062241	0.976873	0.977504	0.41056
40	0.9907	6.693919	0.953226	0.949929	0.95259	0.821119
60	0.6461	4.365541	0.932491	0.925534	0.9313	1.231679
80	0.475	3.209459	0.914066	0.902161	0.912125	1.642238
100	0.3734	2.522973	0.89819	0.88034	0.895441	2.052798
120	0.3068	2.072973	0.885585	0.860697	0.881625	2.463358
160	0.2265	1.530405	0.87173	0.830226	0.863527	3.284477
200	0.1819	1.229054	0.875098	0.814007	0.858116	4.105596
240	0.1548	1.045946	0.893668	0.81192	0.863093	4.926715
300	0.1303	0.880405	0.940285	0.830145	0.883435	6.158394
350	0.1175	0.793919	0.989236	0.859679	0.907336	7.184793
400	0.1085	0.733108	1.043959	0.898094	0.934407	8.211192
450	0.1019	0.688514	1.103013	0.942177	0.962649	9.237591
500	0.09676	0.653784	1.16375	0.990963	0.991653	10.26399
600	0.08937	0.603851	1.289843	1.096203	1.048831	12.31679
700	0.08421	0.568986	1.417933	1.208899	1.104349	14.36959



4b) The Law of Corresponding States states that all gases have the same properties if measured under the same conditions relative to their critcal point. These graphs illustrate the LCOS because the data points for ethane and argon are so similar.

4c) At low volume/high pressure, where the molecules are being forced close together, there are positive deviations from ideality (ideal is Z=1 under all conditions). This is due to repulsive forces pushing the molecules apart. At high volume/low pressure, where the molecules are far apart, there are negative deviations from ideal. This is due to attractive forces drawing the molecules together.

Problem 4, Page 2

Argon T=247 K Vc=0.07530 Pc = 49.288 bar

P (bar)	V (L/mol)	V_R	Z, IG	Z, VDW	Z, RK	PR
0.5	40.506	537.9283	0.98618	0.999345	0.999349	0.010144
2	10.106	134.2098	0.984184	0.997379	0.9974	0.040578
10	1.999	26.54714	0.973374	0.986876	0.98711	0.202889
20	0.9857	13.09031	0.959935	0.973726	0.974521	0.405778
40	0.4795	6.367862	0.933933	0.947513	0.950427	0.811557
60	0.3114	4.135458	0.909781	0.921794	0.928148	1.217335
80	0.2279	3.02656	0.887772	0.897115	0.908156	1.623113
100	0.1785	2.370518	0.869171	0.874247	0.891021	2.028891
120	0.1462	1.941567	0.854271	0.853956	0.877204	2.43467
160	0.1076	1.428951	0.838299	0.824187	0.860794	3.246226
200	0.0863	1.146082	0.840442	0.811591	0.859028	4.057783
240	0.07348	0.97583	0.858712	0.815843	0.868948	4.869339
300	0.06208	0.824436	0.906859	0.84669	0.89733	6.086674
350	0.05626	0.747145	0.958815	0.88739	0.927153	7.10112
400	0.05219	0.693094	1.016516	0.936812	0.95933	8.115566
450	0.04919	0.653254	1.077845	0.991835	0.992155	9.130011
500	0.04687	0.622444	1.141121	1.050894	1.024968	10.14446
600	0.04348	0.577424	1.270304	1.177621	1.089424	12.17335
700	0.04108	0.545551	1.400217	1.313314	1.151918	14.20224