Economics 302
Spring 2007
Answer Key: Homework 3

1. a. Y = 2000. C = 1375. S = 2000-1375-700 = -75. Using the condition S=I implies r=21.5. The graph is the standard one used in section: national savings is a vertical line, the investment demand function is linear, downward sloping and crosses the y-axis at I =1000.

b. In an open economy, the domestic interest rate will equal the world interest rate. The assumption needed to get this is that of perfect capital mobility. Under perfect capital mobility and a world interest rate r*, domestic firms would never pay a domestic investor more than r*, since it could always get a cheaper loan on the international capital market. At the same time, a domestic investor would never lend to a firm at less than r*, since it could always lend its money to a foreign firm and earn return r*. Thus, the equilibrium domestic interest rate with a small open economy must have r=r*.
The appropriate graph should demonstrate that it is the interest rate r=5% which is fixed first. Given this, you can find I(r) from the investment demand curve. Compare this with national income, S, to get the trade balance.

c. National savings will be S = Y-C-G = -75. (Under the assumptions of our Classical model, national savings is unaffected by the real interest rate.)

d. Given r=5%, I(5) = 750. so I=750>-75=S. This means that the country is investing domestically more than it is saving domestically. Thus, capital must be flowing in from somewhere else. Also NX=S-I=-825<0.

e. A world war causes a significant fraction of world governements to spend more and save less (run deficits). Thus, world savings falls. Assuming that the world demand for investment is unchanged (or perhaps increases) then the world interest rate will increase. The "shock" thus has the affect of moving Cowtopia's domestic interest rate to 10%, as it was in part a. Thus, its trade balance is -575. So it is still negative, just less so.

f. In part d, NX=-825=250 – 250 ε, so ε=4.3. In part e, NX= -575 = 250 – 250 ε, so ε=3.3.

2.
a. The natural rate of unemployment is s/(s+f) = 4.76%.
b, c and d. (see the spreadsheet below). The formula simply calculates the employment rate next period given that fraction s of all employed workers lose their job, thus fraction (1-s) of all employed workers stay employed. At the same time, fraction f of all unemployed find a job. Thus, the formula tells the number of workers who will be employed at the beginning of the next period.
As seen in the "unemployment rate" column below, the unemployment rate "converges" to the natural rate of unemployment. Converge is just a fancy way of saying that the numbers get closer and closer to the value to which they are "converging". Notice that, given the rates s and f fixed, the unemployment rate, starting from some arbitrary level, changes each period by some amount. However, the amount that it changes by diminishes as it gets closer and closer to the steady state. In fact, if it started at the steady state, it wouldn't change at all. Thus, the name steady state.

Year	Labor force	Employed	Unemployed	Unemployment rate
0	10,000	8,000	2,000	20.00%
1	10,000	8320	1,680	16.80%
2	10,000	8572.8	1,427	14.27%
3	10,000	8772.512	1,227	12.27%
4	10,000	8930.2845	1,070	10.70%
5	10,000	9054.9247	945	9.45%
6	10,000	9153.3905	847	8.47%
7	10,000	9231.1785	769	7.69%
8	10,000	9292.631	707	7.07%
9	10,000	9341.1785	659	6.59%
10	10,000	9379.531	620	6.20%
11	10,000	9409.8295	590	5.90%
12	10,000	9433.7653	566	5.66%
13	10,000	9452.6746	547	5.47%
14	10,000	9467.6129	532	5.32%
15	10,000	9479.4142	521	5.21%
16	10,000	9488.7372	511	5.11%
17	10,000	9496.1024	504	5.04%
18	10,000	9501.9209	498	4.98%
19	10,000	9506.5175	493	4.93%
20	10,000	9510.1488	490	4.90%
21	10,000	9513.0176	487	4.87%
22	10,000	9515.2839	485	4.85%
23	10,000	9517.0743	483	4.83%
24	10,000	9518.4887	482	4.82%
25	10,000	9519.6061	480	4.80%
26	10,000	9520.4888	480	4.80%
27	10,000	9521.1861	479	4.79%
28	10,000	9521.737	478	4.78%
29	10,000	9522.1723	478	4.78%
30	10,000	9522.5161	477	4.77%
31	10,000	9522.7877	477	4.77%
32	10,000	9523.0023	477	4.77%
33	10,000	9523.1718	477	4.77%
34	10,000	9523.3057	477	4.77%
35	10,000	9523.4115	477	4.77%
36	10,000	9523.4951	477	4.77%
37	10,000	9523.5611	476	4.76%
38	10,000	9523.6133	476	4.76%
39	10,000	9523.6545	476	4.76%
40	10,000	9523.6871	476	4.76%
41	10,000	9523.7128	476	4.76%
42	10,000	9523.7331	476	4.76%
43	10,000	9523.7491	476	4.76%
44	10,000	9523.7618	476	4.76%
45	10,000	9523.7718	476	4.76%

46	10,000	9523.7798	476	4.76%
47	10,000	9523.786	476	4.76%
48	10,000	9523.7909	476	4.76%
49	10,000	9523.7948	476	4.76%
50	10,000	9523.7979	476	4.76%