

MATH 497 - Additional Questions for Homework on Section 4.2.

A. Consider the following sequence of future prices for a particular asset for delivery on day 90.

$t(\text{days})$	$f(t, 90)$
0	65.50
1	65.25
2	66.20
3	66.00
4	64.80
5	62.65
6	60.85
7	61.10
8	59.35
9	61.80
10	60.70
11	62.05
12	64.70
13	63.65
14	61.30
15	60.55

a) Suppose that an investor enters a position of 10 long futures contracts on day 0 and closes their position on day 15. Find the mark to market credits that would occur each day for this investor's account with the clearinghouse.

b) Suppose that the clearinghouse requires for each futures contract on this asset an initial margin of 10% of the initial futures position and a maintenance margin of 5% of the initial futures position. Supposing the investor deposits funds to exactly satisfy the initial margin and any margin calls, find the account balance each day for this investor. Determine which days when margin calls, if any, would occur. [Suppose that no interest is paid on account balances with the clearinghouse.]

c) Find the net gain or loss for this investor.

d) Suppose that an second investor enters a position of 20 short futures contracts on day 7, which they close on day 15. Conduct steps a, b, and c for this investor.

e) Suppose that an third investor enters a position of 50 long futures contracts on day 5, which they close on day 13. Conduct steps a, b, and c for this investor.

B. Consider the following sequence of future prices for a particular asset for delivery on week 52.

$t(\text{weeks})$	$f(t, 52)$
0	123.25
1	126.50
2	128.75
3	127.25
4	124.00
5	124.50
6	122.75
7	120.00
8	121.25
9	119.50
10	121.75
11	122.25
12	123.00
13	125.50

a) Suppose that an investor enters a position of 100 long futures contracts on week 0 and closes their position on week 13. Find the mark to market credits that would occur each day for this investor's account with the clearinghouse.

b) Suppose that the clearinghouse requires for each futures contract on this asset an initial margin of \$10 and a maintenance margin of \$6. Supposing the investor deposits funds to exactly satisfy the initial margin and any margin calls, find the account balance each day for this investor. Determine which days when margin calls, if any, would occur. [Suppose that no interest is paid on account balances with the clearinghouse.]

c) Find the net gain or loss for this investor.

d) Suppose that a second investor enters a position of 20 short futures contracts on week 0, which they close on week 11. Conduct steps a, b, and c for this investor.

e) Suppose that a third investor enters a position of 50 short futures contracts on week 4, which they close on week 12. Conduct steps a, b, and c for this investor.