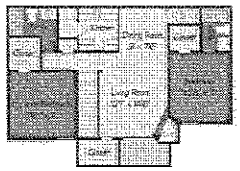
MA111-001 Mini-Exam 3 Name: Practice

In each problem you will be graded on whether each named person is happy (receiving more than they are paying) and whether the money adds up (rent is covered, or side payments can actually be paid).

Emory and Charlie see an ad for a 2-bedroom apartment for \$585 per month. The apartment has 2 bedrooms: the master bedroom and the other bedroom. Emory is willing to pay \$350 per month for the master bedroom or \$270 per month for the other bedroom. Charlie is willing to pay \$325 per month for the master bedroom or \$225 per month for the other bedroom.

	master	other
Emory	\$350	\$270
Charlie	\$325	\$225

350+225 vs 325+270
575 vs 595 ✓



1. Which room should each person get, and how much should they pay?

Charlie should pay \$320 for the master bedroom, (\$5 less than max)
Emory should pay \$265 for the other bedroom (\$5 less than max)
That is \$585 total, so rent is covered.

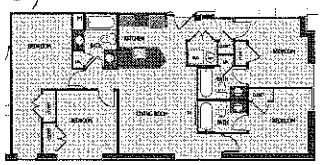
Emory, Charlie, Nikki, and Gayle see an ad for a 4-bedroom apartment for \$1240 per month. The apartment has 4 bedrooms: the master bedroom, the long bedroom, the square bedroom, and the front bedroom. However the prospective roommates disagree on the values of the rooms. The maximum they are willing to pay for each room is in the table. Nobody is willing to share a room.

	master	long	square	front
Emory	\$240	~~\$120~~	~~\$160~~	\$300
Charlie	\$260	~~\$120~~	\$240	~~\$220~~
Nikki	\$280	\$320	\$340	\$400
Gayle	\$320	\$380	\$320	\$420

Lots of possibilities, 22 are too small.

300
260
340
380
1280

\$40 more, so -\$10 each discount



2. Which room should each person get, and how much should they pay?

Emory should pay \$290 for the front bedroom (\$10 less than max)
Charlie should pay \$250 for the master bedroom (\$10 less than max)
Nikki should pay \$330 for the square bedroom (\$10 less than max)
Gayle should pay \$370 for the long bedroom (\$10 less than max)

Four BFF roommates (Charlie, Gayle, Avery, and Blair) won a group costume contest; the set of vampire teeth was the prize. They agree that everyone owns the set of vampire teeth equally. However, they don't want to each take one tooth, and they don't want to take turns using the teeth. They want one person to own the teeth 100%, but that person should pay everybody else for their tooth.

The roommates disagree on the full values of the teeth, so they also disgaree on the value of their own one quarter, and their roommmates three quarters. The values are in the following tables:

	Full Value	Their share	Else's share
Charlie	\$3.00	\$0.75	\$2.25
Gayle	\$7.00	\$1.75	\$5.25
Avery	\$9.00	\$2.25	\$6.75
Blair	\$16.0	\$4.00	\$12.00
Average	\$8.75		

16 − 8.75 = 7.25 extra

$4\overline{)7.25}$ (1.80 rem 5)

so \$1.80 discount for most

3. Who should get the set of teeth and how much money should each person pay or receive?

Blair should get the teeth and pay \$10.15 total (\$1.85 less than max, \$12)

Charlie should be paid \$2.55 of the \$10.15 (\$1.80 more than min, \$0.75)

Gayle should be paid \$3.55 of the \$10.15 (\$1.80 more than min, \$1.75)

Avery should be paid \$4.05 of the \$10.15 (\$1.80 more than min, \$2.25)

The \$10.15 is spent exactly, and everyone got more than expected.

The four BFF roommates (Toni, Charlie, Avery, and Nikki) not only share the rent fairly, they also share boxes of breakfast cereal. However, relationships are strained currently as only 3 boxes of cereal included fabulous prizes. While the friends believe each friend should get one quarter of the prizes, there are 3 prizes and 4 BFFs, creating a bit of a difficulty. The prizes are toys from Ice Age and are named Buck, Ellie, and Carl.

The roommates disagree on the full values of the toys, so they also disgaree on the value of their own one quarter, and their roommmates three quarters. The values are in the following tables:

(Full)	Buck	Ellie	Carl	Total
Toni	\$2.00	\$3.20	\$1.20	\$6.40
Charlie	\$4.40	\$0.80	\$2.40	\$7.60
Avery	\$4.80	\$3.60	\$2.80	\$11.20
Nikki	\$0.40	\$4.00	\$1.60	\$6.00
Average	\$2.90	\$2.90	\$2.00	\$7.80

(Own)	Buck	Ellie	Carl	Total
Toni	\$0.50	\$0.80	\$0.30	\$1.60
Charlie	\$1.10	\$0.20	\$0.60	\$1.90
Avery	\$1.20	\$0.90	\$0.70	\$2.80
Nikki	\$0.10	\$1.00	\$0.40	\$1.50
Total	\$2.90	\$2.90	\$2.00	\$7.80

(Else's)	Buck	Ellie	Carl	Total
Toni	\$1.50	\$2.40	\$0.90	\$4.80
Charlie	\$3.30	\$0.60	\$1.80	\$5.70
Avery	\$3.60	\$2.70	\$2.10	\$8.40
Nikki	\$0.30	\$3.00	\$1.20	\$4.50

4. Who should get each prize and how much money should each person pay or receive?

Avery should get the Bucks and Carl toys; Nikki should get the Ellie toy.

This gives (4.80 − 2.90) + (4.00 − 2.90) + (2.80 − 2.00) = \$3.80 extra $4\overline{)3.80}$ (0.95)

so there is enough extra to give everyone a \$0.95 discount / bonus.

Avery should pay \$3.60 + \$2.10 − \$0.90 − \$0.95 = \$3.85 } \$5.40 total

Nikki should pay \$3.00 − \$0.10 − \$0.40 − \$0.95 = \$1.55 }

Toni should be paid \$0.50 + \$0.80 + \$0.30 + \$0.95 = \$2.55 } \$5.40 total

Charlie should be paid \$1.10 + \$0.20 + \$0.60 + \$0.95 = \$2.85 }

Everybody gets \$0.95 more than expected and the amount paid is equal to the amount received.