SOLUTIONS TO MIDTERM EXAM I QUESTIONS

1.a. (5 pts.)

	Bedrooms	z	$\exp(-z^2/2)$
	5	-0.5855	0.8425
	4	-1.1711	0.5037
	3	-1.7566	0.2138
	7	0.5855	0.8425
st.dev.	1.71		
*	6		

1.b. (10 pts.)

	cost	benefit	benefit	cost	cost
	Price	**Bedrooms**	**Integral garage capacity (cars)**	**Noise level**	**Potential flood risk**
Townhome 1	310	0.8425	2	2	1
Townhome 2	295	0.5037	2	2	3
Townhome 3	210	0.2138	1	3	9
Townhome 4	450	0.8425	3	1	6
*	210	0.8425	3	1	1
-	450	0.2138	1	3	9

STANDARD	Price	Bedrooms	Integral garage capacity (cars)	Noise level	Potential flood risk
Townhome 1	0.5833	1.0000	0.5000	0.5000	1.0000
Townhome 2	0.6458	0.4612	0.5000	0.5000	0.7500
Townhome 3	1.0000	0.0000	0.0000	0.0000	0.0000
Townhome 4	0.0000	1.0000	1.0000	1.0000	0.3750

1.c. (10 pts.)

LINEAR	Price	Bedrooms	Integral garage capacity (cars)	Noise level	Potential flood risk
Townhome 1	0.6774	1.0000	0.6667	0.5000	1.0000
Townhome 2	0.7119	0.5979	0.6667	0.5000	0.3333
Townhome 3	1.0000	0.2537	0.3333	0.3333	0.1111
Townhome 4	0.4667	1.0000	1.0000	1.0000	0.1667

1.d. (10 pts.)

	Price	Bedrooms	Integral garage capacity (cars)	Noise level	Potential flood risk
Townhome 1	0.0032	0.8425	2	0.5	1
Townhome 2	0.0034	0.5037	2	0.5	0.3333
Townhome 3	0.0048	0.2138	1	0.3333	0.11
Townhome 4	0.0022	0.8425	3	1	0.2
sum	0.0136	2.4024	8	2.3333	1.61

MANHATTAN	Price	Bedrooms	Integral garage capacity (cars)	Noise level	Potential flood risk
Townhome 1	0.2372	0.3507	0.2500	0.2143	0.6207
Townhome 2	0.2493	0.2097	0.2500	0.2143	0.2069
Townhome 3	0.3501	0.0890	0.1250	0.1429	0.0690
Townhome 4	0.1634	0.3507	0.3750	0.4286	0.1034

2. (25 pts.)

Based on the pairwise comparison answers to the questions (Q1, Q2, …, Q10):

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	sum	w
Price	2	3	2	3							10	25.00%
Bedrooms	2				3	3	2				10	25.00%
Garage capacity		1			1			2	1		5	12.50%
Noise level			2			1		2		1	6	15.00%
Potential flood risk				1			2		3	3	9	22.50%
											40	100%

Alternatively, you may construct a pairwise comparison matrix:

	Price	Bedrooms	Garage capacity	Noise level	Potential flood risk	sum	w
Price	-	2	3	2	3	10	25.00%
Bedrooms	2	-	3	3	2	10	25.00%
Garage capacity	1	1	-	2	1	5	12.50%
Noise level	2	1	2	-	1	6	15.00%
Potential flood risk	1	2	3	3	-	9	22.50%
						40	100%

The most important attributes are price and number of bedrooms (25%), followed by potential flood risk (22.5%). The importance of noise level is 15%. The least important attribute is garage capacity (12.5%).

3.a. (20 pts.)

Median ranking	Price	Bedrooms	Integral garage capacity (cars)	Noise level	Potential flood risk	Total Rank
Townhome 1	3	1.5	2.5	2.5	1	10.5
Townhome 2	2	3	2.5	2.5	2	12
Townhome 3	1	4	4	4	4	17
Townhome 4	4	1.5	1	1	3	10.5

You recommend your friend to buy Townhome 1 or 4

3.b. (20 pts.)

	25.00%	25.00%	12.50%	15.00%	22.50%	
SAW	Price	Bedrooms	Integral garage capacity (cars)	Noise level	Potential flood risk	Global Score
Townhome 1	0.6774	1.0000	0.6667	0.5000	1.0000	0.8027
Townhome 2	0.7119	0.5979	0.6667	0.5000	0.3333	0.5608
Townhome 3	1.0000	0.2537	0.3333	0.3333	0.1111	0.4301
Townhome 4	0.4667	1.0000	1.0000	1.0000	0.1667	0.6792

You recommend your friend to buy Townhome 1