MAS1343 - Paper 2 solutions

Question 1

- $1.\ 2.545$
- 2. 3
- 3. 8
- 4. 8.813
- 5. -10 20

Question 2

See assignment 1 solutions

Question 3

1. To simulate from a geometric distribution we use:

$$X = 1 + \left[\frac{\log(1-U)}{\log(1-p)}\right]$$

You may also be asked to derive this expression!

2. $u_i = \{0.643, 0.954\}$. So we get 10 and 30.

Question 4

- 1. Conditions for full period m to be achieved are:
 - b and m have no common factors other than 1;
 - (a-1) is a multiple of every prime number divides m;
 - (a-1) is a multiple of 4 if m is a multiple of 4.
- 2. For the generate $r_i = (11r_{i-1} + 2) \mod 7$ we have:
 - a) 1,6,5,1,6,5,1,6,5,1
 - b) 3
 - c) 1

Question 5

The CDF for a ten sided die is:

2	1	2	3	4	5	6	7	8	9	10
$Pr(Z \le z)$	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0

Random numbers: 10,8,1,2

Question 6

- 1. Returns the number of rows and columns
- 2. A two element numerical vector
- 3. Selects rows in dd where a >then 10 and b is less than 0.
- 4. c is also the function name for creating vectors.

Question 7

- 1. Example code:
 - x = TRUE x = data.frame(y=1:10) x = c(1,2,3) x = 5
- 2. Change <<= to <= or ==.

Question 8

1. Monte-Carlo integration

$$\int_0^1 x^2 dx$$

 $2. \ 0.2$