WORKSHEET (4 exercises)

1. In Lecture 8 we introduced the `sample()` function.
Looking in RStudio help , we see the following description of `sample()`

> **Description**
> `sample` takes a sample of the specified size from the elements of `x` using either with or without replacement.

You can use the sample function to create sample data.
sample() The arguments of the function are:
x a vector of values,
size sample size
replace Either use a chosen value more than once or not
prob the probabilities of each value in the input vector

Here is a new function:
set.seed() function allows us to reproduce the exact sample each time we execute a random-related function. The **set**. **seed()** function sets the starting number used to generate a sequence of random numbers. The syntax is `set.seed(n)`, where `n` is a seed number.

The seed number you choose is the starting point used in the generation of a sequence of random numbers. Which is why you will obtain the same results given the same seed number.

EXAMPLE
Create a sample of 100 'fair coin' flips. Use zero and one to denote heads or tails.

```
set.seed(123)
fair_coin <- sample(c(0,1), 100, replace = TRUE)
```

EXERCISE
a) Create a vector consisting of integer elements 5 through 20.
b) Using this vector, create a reproducible sample of 5 integers.
   (i) Allow the sample to have repeated values.
   (ii) Do not allow the sample to have repeated values.

2. The probability distribution of a discrete random variable X is as shown in the table:

x	1	2	3	4	5
P(X=x)	0.0	*A*	0.4	0.1	0.03

Using R as shown in the lecture:
a) Find the missing value *A*
b) P(X < 2)
c) Find the mean of the random variable *X*.
d) Construct the cumulative distribution function of *X.*

3.

a. Calculate 32! (Use R)
b. How many different ways can 5 ULA's be assigned to 3 classes? (Assume 1 ULA per class)
c. How many different ways can a professor choose 10 out of 85 exam papers to review, assuming order does not matter.

4.

Using the method shown in lecture 8, demo 9, calculate the probability of scoring a 4 when rolling a fair 6-sided die.

END WORKSHEET 8