

1. You can create your own functions in R. These are created using the `function` command. For example, we can design our own function to calculate mean.

```
> MYMEAN = function(x) { sum(x)/length(x) }
```

Then you can say

```
> x = c(1,2,3)
> MYMEAN = function(x) { sum(x)/length(x) }
> MYMEAN(x)
```

```
[1] 2
```

A function in R is another object, with the class `function`. It typically will return the last value computed in the body. Compute the output of `MYMEAN` for

```
> x = 1:100
> y = x[x<50 | x >2]
```

2. Suppose roll a fair die two times and let  $X_1$  and  $X_2$  be denote outcomes on each of the rolls. Let  $Y = X_1 + X_2$ .
  - (a) Find the Range of  $Y$
  - (b) For each  $y \in Y$ , find the  $f_Y(y) = P(Y = y)$ .
  - (c) Write an R-function that returns  $f_Y(\cdot)$  for any given value  $y$  in Range of  $Y$ .
3. Suppose roll a fair die once and let  $X$  denote the outcome. Then we toss a biased coin, with  $0 < p < 1$  being probability of obtaining heads,  $X$  times. Let  $Y$  denote the number of heads in  $X$  tosses.
  - (a) Find the Range of  $Y$
  - (b) For each  $y \in Y$ , find the  $f_Y(y) = P(Y = y)$ .
  - (c) Write an R-function that returns  $f_Y(\cdot)$  for any given value  $y$  in Range of  $Y$ .