1.

```
two.dice <- matrix( c(3, 5, 5, 4, 4, 3, 4, 5, 5, 2, 3, 2, 6, 6, 6,
                      3, 6, 2, 1, 2, 5, 6, 1, 5, 6, 1, 3, 6, 6, 3,
                      5, 3, 3, 5, 3, 3, 4, 2, 1, 4, 3, 1, 5, 1, 6,
                      4, 5, 5, 3, 5, 2, 2, 1, 2, 2, 6, 1, 3, 4, 5,
                      6, 4, 3, 3, 6, 1, 2, 1, 4, 5, 1, 1, 2, 3, 6,
                      5, 6, 5, 3, 1, 4, 1, 5, 2, 2, 6, 3, 2, 3, 1,
                      5, 1, 2, 5, 1, 1, 1, 3, 1, 3, 4, 1, 6, 5, 1,
                      5, 6, 6, 5, 5, 2, 4, 1, 3, 5, 2, 1, 1, 1, 1), ncol = 2)
S <- c()
i <- 1
while (length(unique(S)) < 11) {
   S <- c(S, sum(two.dice[i, ]))
   i <- i + 1
}
print(length(S))
```

```
[1] 43
```

2.

```
U <- c(0.89, 0.03, 0.52, 0.41, 0.09, 0.37, 0.71, 0.29, 0.01, 0.92,
           0.53, 0.14, 0.64, 0.94, 0.89, 0.19, 0.33, 0.31, 0.24, 0.15)
n <- 0
product <- 1
while (product > 1e-08) {
   n <- n + 1
   product <- product * U[n]
}
print(n - 1)
```

```
[1] 15
```

3.

```
Math <- c(79, 61, 76, 40, 51, 98, 48, 34, 54, 51, 45, 61, 75, 42, 32,
                61, 56, 82, 22, 33, 19, 60, 91, 49, 44)
English <- c(87, 54, 96, 63, 58, 75, 60, 74, 46, 94, 57, 69, 69, 55, 79,
```

```
                94, 72, 86, 85, 56, 62, 77, 78, 62, 56)
```

(a)

```
scores <- matrix(c(Math, English), ncol = 2)
colnames(scores) <- c("Math", "English")
rownames(scores) <- 1 : nrow(scores)
scores
```

```
   Math English
1    79      87
2    61      54
3    76      96
4    40      63
5    51      58
6    98      75
7    48      60
8    34      74
9    54      46
10   51      94
11   45      57
12   61      69
13   75      69
14   42      55
15   32      79
16   61      94
17   56      72
18   82      86
19   22      85
20   33      56
21   19      62
22   60      77
23   91      78
24   49      62
25   44      56
```

(b)

```
Class = rep("D", nrow(scores))
```

```
Class[which(Math >= 60 & English >= 60)] = "A"
Class[which(Math >= 60 & English < 60)] = "B"
Class[which(Math < 60 & English >= 60)] = "C"
for (i in c("A", "B", "C", "D")) {
   cat("Number of event ", i, ": ", length(which(Class == i)), "\n", sep = "")
}
```

```
Number of event A: 9
Number of event B: 1
Number of event C: 9
Number of event D: 6
```

(c)

```
for (i in c("A", "B", "C", "D")) {
   cat("Students' ID in category", paste(i, ":", sep = ""), which(Class == i), "\n")
}
```

```
Students' ID in category A: 1 3 6 12 13 16 18 22 23
Students' ID in category B: 2
Students' ID in category C: 4 7 8 10 15 17 19 21 24
Students' ID in category D: 5 9 11 14 20 25
```

4.

```
#v <- c(5, 10, 11, 1, 0, 3, 8, 10, 4, 0, 1, 6, 7, 10, 7, 0)
v <- c(7, 5, 0, 1, 2, 7, 1, 10, 5, 0, 3, 7, 2, 3, 3)
v <- v[-which(v == 0)]

# using cat()
cat("(1) Sum: ", sum(v), "\n",
      "(2) Length: ", length(v), "\n",
      "(3) Average: ", mean(v), "\n",
      "(4) # of odd: ", length(which(v %% 2 == 1)), "\n",
      "(5) # of 10: ", length(which(v == 10)), "\n",
      "(6) Max: ", max(v), "\n", sep = "")
```

```
(1) Sum: 56
(2) Length: 13
(3) Average: 4.307692
```

```
(4) # of odd: 10
(5) # of 10: 1
(6) Max: 10
```

```
# using paste()
writeLines(paste("(1) Sum: ", sum(v), "\n",
      "(2) Length: ", length(v), "\n",
      "(3) Average: ", mean(v), "\n",
      "(4) # of odd: ", length(which(v %% 2 == 1)), "\n",
      "(5) # of 10: ", length(which(v == 10)), "\n",
      "(6) Max: ", max(v), "\n", sep = ""))
```

```
(1) Sum: 56
(2) Length: 13
(3) Average: 4.307692
(4) # of odd: 10
(5) # of 10: 1
(6) Max: 10
```