# R STUDIO – EXERCISE 3

## QUESTION 1

Create a random variable with 10 values with and without values repeated.

```
> sample(1:10,10, replace = TRUE)
   [1]  7  1  2  6  7 10  2  8  5  1
> sample(1:10,10, replace = FALSE)
   [1]  8  4  2  9  3  7  5 10  1  6
```

## QUESTION 2

Create a random variable with 10 values with and without values repeated.

```
> rolldie(3,nsides = 6, makespace = T)
    X1 X2 X3      probs
1    1  1  1 0.00462963
2    2  1  1 0.00462963
3    3  1  1 0.00462963
4    4  1  1 0.00462963
5    5  1  1 0.00462963
6    6  1  1 0.00462963
7    1  2  1 0.00462963
8    2  2  1 0.00462963
9    3  2  1 0.00462963
10   4  2  1 0.00462963
11   5  2  1 0.00462963
12   6  2  1 0.00462963
13   1  3  1 0.00462963
14   2  3  1 0.00462963
15   3  3  1 0.00462963
16   4  3  1 0.00462963
17   5  3  1 0.00462963
18   6  3  1 0.00462963
19   1  4  1 0.00462963
20   2  4  1 0.00462963
21   3  4  1 0.00462963
22   4  4  1 0.00462963
23   5  4  1 0.00462963
24   6  4  1 0.00462963
25   1  5  1 0.00462963
```

| | | | | |
|---|---|---|---|---|
| 26 | 2 | 5 | 1 | 0.00462963 |
| 27 | 3 | 5 | 1 | 0.00462963 |
| 28 | 4 | 5 | 1 | 0.00462963 |
| 29 | 5 | 5 | 1 | 0.00462963 |
| 30 | 6 | 5 | 1 | 0.00462963 |
| 31 | 1 | 6 | 1 | 0.00462963 |
| 32 | 2 | 6 | 1 | 0.00462963 |
| 33 | 3 | 6 | 1 | 0.00462963 |
| 34 | 4 | 6 | 1 | 0.00462963 |
| 35 | 5 | 6 | 1 | 0.00462963 |
| 36 | 6 | 6 | 1 | 0.00462963 |
| 37 | 1 | 1 | 2 | 0.00462963 |
| 38 | 2 | 1 | 2 | 0.00462963 |
| 39 | 3 | 1 | 2 | 0.00462963 |
| 40 | 4 | 1 | 2 | 0.00462963 |
| 41 | 5 | 1 | 2 | 0.00462963 |
| 42 | 6 | 1 | 2 | 0.00462963 |
| 43 | 1 | 2 | 2 | 0.00462963 |
| 44 | 2 | 2 | 2 | 0.00462963 |
| 45 | 3 | 2 | 2 | 0.00462963 |
| 46 | 4 | 2 | 2 | 0.00462963 |
| 47 | 5 | 2 | 2 | 0.00462963 |
| 48 | 6 | 2 | 2 | 0.00462963 |
| 49 | 1 | 3 | 2 | 0.00462963 |
| 50 | 2 | 3 | 2 | 0.00462963 |
| 51 | 3 | 3 | 2 | 0.00462963 |
| 52 | 4 | 3 | 2 | 0.00462963 |
| 53 | 5 | 3 | 2 | 0.00462963 |
| 54 | 6 | 3 | 2 | 0.00462963 |
| 55 | 1 | 4 | 2 | 0.00462963 |
| 56 | 2 | 4 | 2 | 0.00462963 |
| 57 | 3 | 4 | 2 | 0.00462963 |
| 58 | 4 | 4 | 2 | 0.00462963 |
| 59 | 5 | 4 | 2 | 0.00462963 |
| 60 | 6 | 4 | 2 | 0.00462963 |
| 61 | 1 | 5 | 2 | 0.00462963 |
| 62 | 2 | 5 | 2 | 0.00462963 |
| 63 | 3 | 5 | 2 | 0.00462963 |
| 64 | 4 | 5 | 2 | 0.00462963 |
| 65 | 5 | 5 | 2 | 0.00462963 |
| 66 | 6 | 5 | 2 | 0.00462963 |
| 67 | 1 | 6 | 2 | 0.00462963 |
| 68 | 2 | 6 | 2 | 0.00462963 |
| 69 | 3 | 6 | 2 | 0.00462963 |
| 70 | 4 | 6 | 2 | 0.00462963 |
| 71 | 5 | 6 | 2 | 0.00462963 |

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| 72 | 6 | 6 | 2 | 0.00462963 |
| 73 | 1 | 1 | 3 | 0.00462963 |
| 74 | 2 | 1 | 3 | 0.00462963 |
| 75 | 3 | 1 | 3 | 0.00462963 |
| 76 | 4 | 1 | 3 | 0.00462963 |
| 77 | 5 | 1 | 3 | 0.00462963 |
| 78 | 6 | 1 | 3 | 0.00462963 |
| 79 | 1 | 2 | 3 | 0.00462963 |
| 80 | 2 | 2 | 3 | 0.00462963 |
| 81 | 3 | 2 | 3 | 0.00462963 |
| 82 | 4 | 2 | 3 | 0.00462963 |
| 83 | 5 | 2 | 3 | 0.00462963 |
| 84 | 6 | 2 | 3 | 0.00462963 |
| 85 | 1 | 3 | 3 | 0.00462963 |
| 86 | 2 | 3 | 3 | 0.00462963 |
| 87 | 3 | 3 | 3 | 0.00462963 |
| 88 | 4 | 3 | 3 | 0.00462963 |
| 89 | 5 | 3 | 3 | 0.00462963 |
| 90 | 6 | 3 | 3 | 0.00462963 |
| 91 | 1 | 4 | 3 | 0.00462963 |
| 92 | 2 | 4 | 3 | 0.00462963 |
| 93 | 3 | 4 | 3 | 0.00462963 |
| 94 | 4 | 4 | 3 | 0.00462963 |
| 95 | 5 | 4 | 3 | 0.00462963 |
| 96 | 6 | 4 | 3 | 0.00462963 |
| 97 | 1 | 5 | 3 | 0.00462963 |
| 98 | 2 | 5 | 3 | 0.00462963 |
| 99 | 3 | 5 | 3 | 0.00462963 |
| 100 | 4 | 5 | 3 | 0.00462963 |
| 101 | 5 | 5 | 3 | 0.00462963 |
| 102 | 6 | 5 | 3 | 0.00462963 |
| 103 | 1 | 6 | 3 | 0.00462963 |
| 104 | 2 | 6 | 3 | 0.00462963 |
| 105 | 3 | 6 | 3 | 0.00462963 |
| 106 | 4 | 6 | 3 | 0.00462963 |
| 107 | 5 | 6 | 3 | 0.00462963 |
| 108 | 6 | 6 | 3 | 0.00462963 |
| 109 | 1 | 1 | 4 | 0.00462963 |
| 110 | 2 | 1 | 4 | 0.00462963 |
| 111 | 3 | 1 | 4 | 0.00462963 |
| 112 | 4 | 1 | 4 | 0.00462963 |
| 113 | 5 | 1 | 4 | 0.00462963 |
| 114 | 6 | 1 | 4 | 0.00462963 |
| 115 | 1 | 2 | 4 | 0.00462963 |
| 116 | 2 | 2 | 4 | 0.00462963 |
| 117 | 3 | 2 | 4 | 0.00462963 |

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| 118 | 4 | 2 | 4 | 0.00462963 |
| 119 | 5 | 2 | 4 | 0.00462963 |
| 120 | 6 | 2 | 4 | 0.00462963 |
| 121 | 1 | 3 | 4 | 0.00462963 |
| 122 | 2 | 3 | 4 | 0.00462963 |
| 123 | 3 | 3 | 4 | 0.00462963 |
| 124 | 4 | 3 | 4 | 0.00462963 |
| 125 | 5 | 3 | 4 | 0.00462963 |
| 126 | 6 | 3 | 4 | 0.00462963 |
| 127 | 1 | 4 | 4 | 0.00462963 |
| 128 | 2 | 4 | 4 | 0.00462963 |
| 129 | 3 | 4 | 4 | 0.00462963 |
| 130 | 4 | 4 | 4 | 0.00462963 |
| 131 | 5 | 4 | 4 | 0.00462963 |
| 132 | 6 | 4 | 4 | 0.00462963 |
| 133 | 1 | 5 | 4 | 0.00462963 |
| 134 | 2 | 5 | 4 | 0.00462963 |
| 135 | 3 | 5 | 4 | 0.00462963 |
| 136 | 4 | 5 | 4 | 0.00462963 |
| 137 | 5 | 5 | 4 | 0.00462963 |
| 138 | 6 | 5 | 4 | 0.00462963 |
| 139 | 1 | 6 | 4 | 0.00462963 |
| 140 | 2 | 6 | 4 | 0.00462963 |
| 141 | 3 | 6 | 4 | 0.00462963 |
| 142 | 4 | 6 | 4 | 0.00462963 |
| 143 | 5 | 6 | 4 | 0.00462963 |
| 144 | 6 | 6 | 4 | 0.00462963 |
| 145 | 1 | 1 | 5 | 0.00462963 |
| 146 | 2 | 1 | 5 | 0.00462963 |
| 147 | 3 | 1 | 5 | 0.00462963 |
| 148 | 4 | 1 | 5 | 0.00462963 |
| 149 | 5 | 1 | 5 | 0.00462963 |
| 150 | 6 | 1 | 5 | 0.00462963 |
| 151 | 1 | 2 | 5 | 0.00462963 |
| 152 | 2 | 2 | 5 | 0.00462963 |
| 153 | 3 | 2 | 5 | 0.00462963 |
| 154 | 4 | 2 | 5 | 0.00462963 |
| 155 | 5 | 2 | 5 | 0.00462963 |
| 156 | 6 | 2 | 5 | 0.00462963 |
| 157 | 1 | 3 | 5 | 0.00462963 |
| 158 | 2 | 3 | 5 | 0.00462963 |
| 159 | 3 | 3 | 5 | 0.00462963 |
| 160 | 4 | 3 | 5 | 0.00462963 |
| 161 | 5 | 3 | 5 | 0.00462963 |
| 162 | 6 | 3 | 5 | 0.00462963 |
| 163 | 1 | 4 | 5 | 0.00462963 |

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| 164 | 2 | 4 | 5 | 0.00462963 |
| 165 | 3 | 4 | 5 | 0.00462963 |
| 166 | 4 | 4 | 5 | 0.00462963 |
| 167 | 5 | 4 | 5 | 0.00462963 |
| 168 | 6 | 4 | 5 | 0.00462963 |
| 169 | 1 | 5 | 5 | 0.00462963 |
| 170 | 2 | 5 | 5 | 0.00462963 |
| 171 | 3 | 5 | 5 | 0.00462963 |
| 172 | 4 | 5 | 5 | 0.00462963 |
| 173 | 5 | 5 | 5 | 0.00462963 |
| 174 | 6 | 5 | 5 | 0.00462963 |
| 175 | 1 | 6 | 5 | 0.00462963 |
| 176 | 2 | 6 | 5 | 0.00462963 |
| 177 | 3 | 6 | 5 | 0.00462963 |
| 178 | 4 | 6 | 5 | 0.00462963 |
| 179 | 5 | 6 | 5 | 0.00462963 |
| 180 | 6 | 6 | 5 | 0.00462963 |
| 181 | 1 | 1 | 6 | 0.00462963 |
| 182 | 2 | 1 | 6 | 0.00462963 |
| 183 | 3 | 1 | 6 | 0.00462963 |
| 184 | 4 | 1 | 6 | 0.00462963 |
| 185 | 5 | 1 | 6 | 0.00462963 |
| 186 | 6 | 1 | 6 | 0.00462963 |
| 187 | 1 | 2 | 6 | 0.00462963 |
| 188 | 2 | 2 | 6 | 0.00462963 |
| 189 | 3 | 2 | 6 | 0.00462963 |
| 190 | 4 | 2 | 6 | 0.00462963 |
| 191 | 5 | 2 | 6 | 0.00462963 |
| 192 | 6 | 2 | 6 | 0.00462963 |
| 193 | 1 | 3 | 6 | 0.00462963 |
| 194 | 2 | 3 | 6 | 0.00462963 |
| 195 | 3 | 3 | 6 | 0.00462963 |
| 196 | 4 | 3 | 6 | 0.00462963 |
| 197 | 5 | 3 | 6 | 0.00462963 |
| 198 | 6 | 3 | 6 | 0.00462963 |
| 199 | 1 | 4 | 6 | 0.00462963 |
| 200 | 2 | 4 | 6 | 0.00462963 |
| 201 | 3 | 4 | 6 | 0.00462963 |
| 202 | 4 | 4 | 6 | 0.00462963 |
| 203 | 5 | 4 | 6 | 0.00462963 |
| 204 | 6 | 4 | 6 | 0.00462963 |
| 205 | 1 | 5 | 6 | 0.00462963 |
| 206 | 2 | 5 | 6 | 0.00462963 |
| 207 | 3 | 5 | 6 | 0.00462963 |
| 208 | 4 | 5 | 6 | 0.00462963 |
| 209 | 5 | 5 | 6 | 0.00462963 |

```
210   6   5   6 0.00462963
211   1   6   6 0.00462963
212   2   6   6 0.00462963
213   3   6   6 0.00462963
214   4   6   6 0.00462963
215   5   6   6 0.00462963
216   6   6   6 0.00462963
```

```
> tosscoin(4,makespace = T)
   toss1 toss2 toss3 toss4  probs
1      H     H     H     H 0.0625
2      T     H     H     H 0.0625
3      H     T     H     H 0.0625
4      T     T     H     H 0.0625
5      H     H     T     H 0.0625
6      T     H     T     H 0.0625
7      H     T     T     H 0.0625
8      T     T     T     H 0.0625
9      H     H     H     T 0.0625
10     T     H     H     T 0.0625
11     H     T     H     T 0.0625
12     T     T     H     T 0.0625
13     H     H     T     T 0.0625
14     T     H     T     T 0.0625
15     H     T     T     T 0.0625
16     T     T     T     T 0.0625
```

## QUESTION 3

Find 5C3,6p2 using R .

```
> choose(5,3)
[1] 10

> choose(6,2)*fact(4)
[1] 360
```

## QUESTION 4

By throwing a fair dice, a player gains Rs.20 if 2 turns up, gains Rs.40 if 4 turns up and loses Rs.30 if 6 turns up. He never loses or gains if any other number turns up. Find the expected value of money he gains. Also find the variance.

```
> x=c(0,20,0,40,0,-30)
> p=c(1/6,1/6,1/6,1/6,1/6,1/6)

> sum(x*p)/6
[1] 0.8333333

> sum(x*x*p)/6-((sum(x*p)/6)^2)
[1] 79.86111
```