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Program generates random number from fair five sided die.

```
#library(tidyverse)
#Question 7A
set.seed(10072021)
die <- c(sample(1:5, 100, replace = TRUE, prob = c(1/15, 2/15, 3/15, 4/15, 5/15))) #Generate random int

mean_dice_value <- mean.default(die, trim = 0, na.rm = FALSE) #Calculate mean of random numbers
print('Mean = ')
```

```
## [1] "Mean = "
```

```
print(mean_dice_value) #Print mean value
```

```
## [1] 3.63
```

```
sd_dice_value <- sd(die) #Determine standard deviation of random numbers
print('Standard Deviation = ')
```

```
## [1] "Standard Deviation = "
```

```
print(sd_dice_value)
```

```
## [1] 1.315448
```

```
var_dice_value = var(die)
print('Variance = ')
```

```
## [1] "Variance = "
```

```
print(var_dice_value)
```

```
## [1] 1.730404
```

```
sample = c(1,2,3,4,5)

n = length(sample)

prob = c(1/15, 2/15, 3/15, 4/15, 5/15)

mean_distribution = sum(sample*prob)

print('mean_distribution = ')
```

```
## [1] "mean_distribution = "
```

```
print(mean_distribution)
```

```
## [1] 3.666667
```

```
var_distribution = sum(((sample- mean_distribution)^2)*prob)

print('var_distribution = ')
```

```
## [1] "var_distribution = "
```

```
print(var_distribution)
```

```
## [1] 1.555556
```

```
#Question 7B
mean_error = mean_distribution - mean_dice_value
print('Error or difference in mean of distribution and mean of sample drawn   = ')
```

```
## [1] "Error or difference in mean of distribution and mean of sample drawn   = "
```

```
print(mean_error)
```

```
## [1] 0.03666667
```

```
var_error = var_distribution - var_dice_value
print('Error or difference in variance of distribution and variance of sample drawn   = ')
```

```
## [1] "Error or difference in variance of distribution and variance of sample drawn   = "
```

```
print(var_error)
```

```
## [1] -0.1748485
```

```
#Response to question 7B
#In the sample drawn in R and Stata, we have set the seed to 10072021 and we have made 100 observations
#that are randomly generated using the random integer generator.
#Hence the observed mean/variance is different from the calculate mean/variance.
#The observed mean/variance will again change if the number of observations are changed.
```