

Statistics Code Sample

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R Markdown

I. Third Smallest Dice: Given seven dices that are all rolled at the same time, what value would the dice, with the third smallest number of the seven dices, hold?

```
library(dplyr)                                # for functions

##
## Attaching package: 'dplyr'
## The following objects are masked from 'package:stats':
##
##   filter, lag
## The following objects are masked from 'package:base':
##
##   intersect, setdiff, setequal, union

library(ggplot2)                              # for data visualization

# Function: Rolls 7 dices to return third smallest dice
seven.dice <- function() {
  dice <- sample(1:6, size = 7, replace = TRUE)
  sort(dice, decreasing = FALSE)
  return(dice[3])
}

# Monte Carlo
face <- 1:6                                  # dice face numbers
count <- c(0,0,0,0,0,0)                      # aggregate results
set.seed(100)

for (i in 1:10000) {                          # generate random inputs
  y <- seven.dice()
  if (y == 1) {                               # deterministic computation

    count[1] = count[1] + 1

  } else if (y == 2) {

    count[2] = count[2] + 1

  } else if (y == 3) {

    count[3] = count[3] + 1
```

```

} else if (y == 4) {

  count[4] = count[4] + 1

} else if (y == 5) {

  count[5] = count[5] + 1

} else {

  count[6] = count[6] + 1

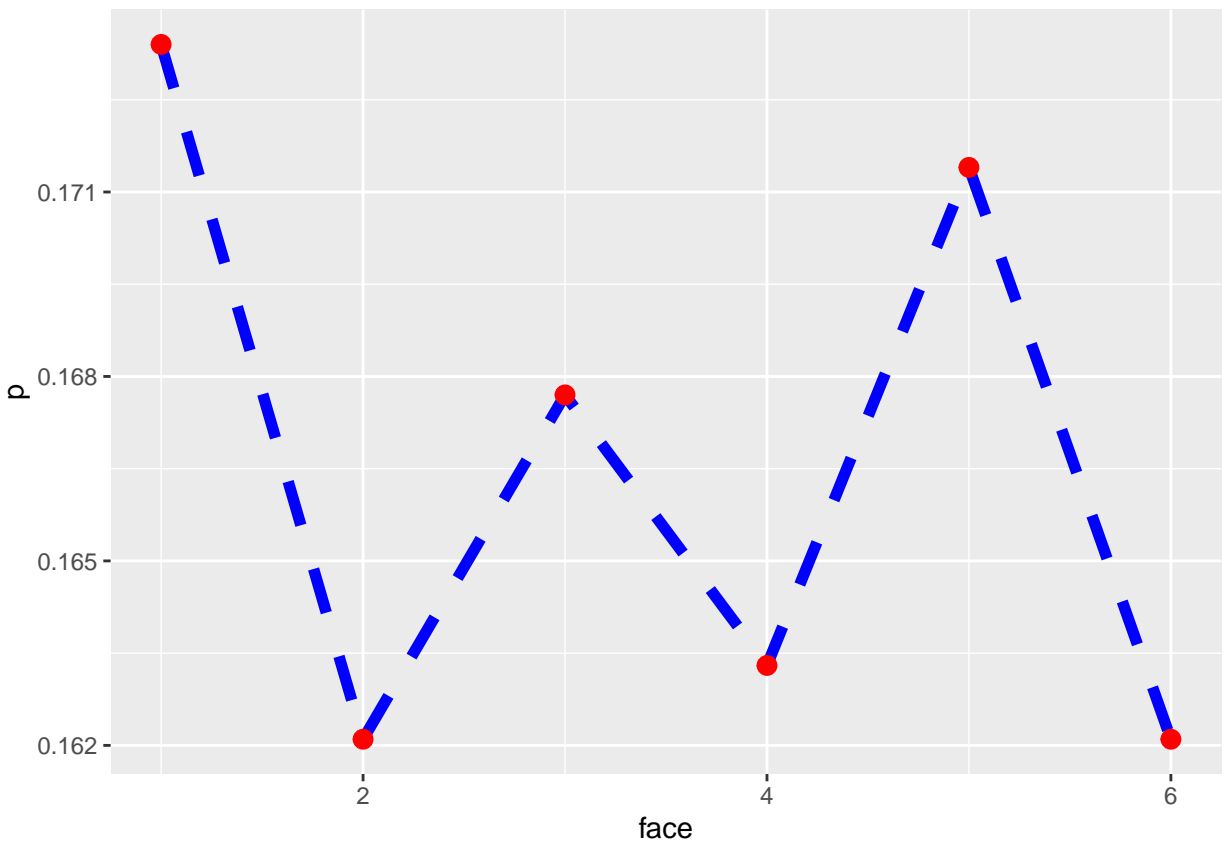
}
}

# Probability of each face number
p <- count / 10000
print(paste("Probability of", face, ":", p))

## [1] "Probability of 1 : 0.1734" "Probability of 2 : 0.1621"
## [3] "Probability of 3 : 0.1677" "Probability of 4 : 0.1633"
## [5] "Probability of 5 : 0.1714" "Probability of 6 : 0.1621"

# Line chart of pdf
dice_pdf <- data.frame(face,p)
ggplot(dice_pdf, aes(x=face, y=p)) + geom_line(linetype="dashed", color="blue", size= 2) + geom_point(c

```



```
# Line chart of cdf
```

```
p[2] = p[1] + p[2]
```

```
p[3] = p[3] + p[2]
```

```
p[4] = p[4] + p[3]
```

```
p[5] = p[5] + p[4]
```

```
p[6] = p[5] + p[6]
```

```
dice_cdf <- data.frame(face,p)
```

```
ggplot(dice_cdf, aes(x=face, y=p)) + geom_line(linetype="dashed", color="blue", size= 2) + geom_point(col
```

