Geometric Distribution

Elisha Borromeo

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2. Geometric Distribution

1. Set the probability of success: p <- 0.2

```
p <- 0.2
```

2. Generate 1000 random variables from the geometric distribution.

To generate the 1000 random variables, we can use rgeom function which generates a random sample from a geometric distribution. We add 1 because this function returns the number of failures before the first success.

```
x <- rgeom(1000, prob = p) + 1
```

3. Calculate some basic statistics:

```
mean_x <- mean(x)
var_x <- var(x)
sd_x <- sd(x)
```

4. Print the results in item 3 with the following output (string): For the number of trials required to achieve the first success, we assume that this asks for how many trials it took for the first simulation to be successful. These results vary.

```
cat("Number of trials required to achieve first success:" ,x[1], "\n")
```

```
## Number of trials required to achieve first success: 9
```

```
cat("Mean (in 2 decimal places):", round(mean_x, 2), "\n")
```

```
## Mean (in 2 decimal places): 5.29
```

```
cat("Variance (in 2 decimal places):", round(var_x, 2), "\n")
```

```
## Variance (in 2 decimal places): 24.34
```

```r
cat("Standard deviation (in 2 decimal places):", round(sd_x, 2), "\n")
```

```
## Standard deviation (in 2 decimal places): 4.93
```

5. Plot the histogram of the results.

```r
hist(x, breaks = 10, col = "violet", main = "Histogram of Results of the Geometric Distribution",
     xlab = "Number of Trials", ylab = "Frequency", border = "black")
```