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```
set.seed(1)
n <- 55
match <- 0

# Simulate 10000 rooms and check for matches in each room
for(i in 1:10000){
  birthdays <- sample(365, n, replace = TRUE)
  if(length(unique(birthdays)) < n){
    match <- match + 1
  }
}

# Calculate the estimated probability of a match and print it
p_match <- match / 10000
print(p_match)
```

```
## [1] 0.9849
```

Pbirthday Function

```
pbirthday(25)
```

```
## [1] 0.5686997
```

```
pbirthday(35)
```

```
## [1] 0.8143832
```

```
pbirthday(45)
```

```
## [1] 0.9409759
```

```
pbirthday(55)
```

```
## [1] 0.9862623
```

Match Probabilities

```r
n_size <- c(1:55)
match_p <- sapply(n_size, pbirthday)
print(match_p)
```

```
##  [1] 0.000000000 0.002739726 0.008204166 0.016355912 0.027135574 0.040462484
##  [7] 0.056235703 0.074335292 0.094623834 0.116948178 0.141141378 0.167024789
## [13] 0.194410275 0.223102512 0.252901320 0.283604005 0.315007665 0.346911418
## [19] 0.379118526 0.411438384 0.443688335 0.475695308 0.507297234 0.538344258
## [25] 0.568699704 0.598240820 0.626859282 0.654461472 0.680968537 0.706316243
## [31] 0.730454634 0.753347528 0.774971854 0.795316865 0.814383239 0.832182106
## [37] 0.848734008 0.864067821 0.878219664 0.891231810 0.903151611 0.914030472
## [43] 0.923922856 0.932885369 0.940975899 0.948252843 0.954774403 0.960597973
## [49] 0.965779609 0.970373580 0.974431993 0.978004509 0.981138113 0.983876963
## [55] 0.986262289
```

```r
plot(match_p ~ n_size)
```