Birthday Problem

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Class size = 2

```
k2 <- 2

p2 <- prod(365 : (365 - k2 + 1))/ (365^k2) # Probability each birthday is different

1 - p2 # probability at least 2 birthdays are the same
```

```
## [1] 0.002739726
```

Class size = 10

```
k10 <- 10

p10 <- prod(365 : (365 - k10 + 1))/ (365^k10) # Probability each birthday is different

1 - p10 # probability at least 2 birthdays are the same
```

```
## [1] 0.1169482
```

Class size = 20

```
k20 <- 20

p20 <- prod(365 : (365 - k20 + 1))/ (365^k20) # Probability each birthday is different

1 - p20 # probability at least 2 birthdays are the same
```

```
## [1] 0.4114384
```

Write a function to take in 2 arguments (n, k), calculate the probability, and then plot it

```
birthday <- function(n, k) {

  p <- prod(n : (n - k + 1)) / (n ^ k)

  return(1-p)

}
```

```r
## Do a for-loop

j <- numeric(50)

for (i in 1:50) {

  j[i] <- birthday(365, i)

}

plot(j, xlab = "n", ylab = "Probability")
```