Probability Homework #12

Title: “HW#12”

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output: html_document

Problem 3.32b.

#Modify the Balls.R script to simulate the distribution of 700 red blood cells on a hemocytometer slide. Use your simulation to estimate the probability that a square contains between 3 and 6 cells.

```
n <- 700
u <- 160
lambda = n/u
bowls <- rep(0,u)
for (i in 1:n)
{
    i <- sample(1:u,1)
    bowls[i] <- bowls[i] + 1
}
bowls
```

```
##   [1]  4  6  3  5  6  3  4  8  6  4  3  3  4  4  5  4  2  5  3  4  1  3  3  2  5
##  [26]  4  3  6  3  0  5  7  4  0  7  4  1  5  6  2  4  5  4  4  5  7  1  5  0  7
##  [51]  7  6  3  4  2  4  1  3  4  4  6  7  4  3  5  1  6  4  4  3  3 14  5  3  5
##  [76]  5  9  4  5  9  4  6  3  5  1  3  3  6  4  3  7  6  5  7  4  3  4  4  5  6
## [101]  5  2  2  2  4  7  2  6  7  2  7  8  4  5  9  4  4  4  6  3  2  4  2 10  7
## [126]  4  3  3  3  3  5  3  7  3  4  4  5  4  3  2  7  4  5  4  4  3  2  9  2  8
## [151]  3 11  6  7  4  2  4  5  2  3
```

```
table(bowls)
```

```
## bowls
##  0  1  2  3  4  5  6  7  8  9 10 11 14
##  3  6 16 31 41 23 15 15  3  4  1  1  1
```

```
round(dpois(0:max(bowls),lambda)*u,2)
```

```
##  [1]  2.01  8.81 19.28 28.11 30.75 26.90 19.62 12.26  6.70  3.26  1.43  0.57
## [13]  0.21  0.07  0.02
```

```
print ("P between 3 and 6 cells simulate")
```

```
## [1] "P between 3 and 6 cells simulate"
```

```
sum(table(bowls)[3:6]) /160
```

```
## [1] 0.69375
```

```
print ("P between 3 and 6 based on Poisson mode")
```

```
## [1] "P between 3 and 6 based on Poisson mode"
```

Problem 3.43

#Choose your favorite value of lamba and let X~ Pois(lambda). Simulate the probability that X is odd.

```
n <- 500
u <- 100
lambda = n/u
bowls <- rep(0,u)
for (i in 1:n)
{
    i <- sample(1:u,1)
    bowls[i] <- bowls[i] + 1
}
table(bowls)
```

```
## bowls
##  1  2  3  4  5  6  7  8  9 10 11
##  3  9 17 12 22 16  9  4  3  3  2
```

```
sum(bowls%%2==1) /u
```

```
## [1] 0.56
```

```
sum(bowls%%2==0) /u
```

```
## [1] 0.44
```

```
odds <- 1:round(max(bowls)/2)*2-1
sum(round(dpois(0:max(bowls),lambda)*u,2)[odds])/100
```

```
## [1] 0.496
```

```
value <- (1 - exp(-2*lambda)) / 2
value
```

```
## [1] 0.4999773
```