

Homework 6

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Additional problem #2

Part a. Marginal distribution of x

```
n <- 1000000
N <- sample(0:3, n, prob = c(.15, .2, .5, .15), replace = T)
X <- rbinom(n, size = N, prob = 0.5)

# marginal of X
length(which(X == 0))/n
```

```
## [1] 0.393567
```

```
length(which(X == 1))/n
```

```
## [1] 0.406877
```

```
length(which(X == 2))/n
```

```
## [1] 0.180799
```

```
length(which(X == 3))/n
```

```
## [1] 0.018757
```

Part b. Conditional distribution of N given $X = 0$

```
condit <- N[X==0]
length(which(condit == 0))/length(condit)
```

```
## [1] 0.3802453
```

```
length(which(condit == 1))/length(condit)
```

```
## [1] 0.2537738
```

```
length(which(condit == 2))/length(condit)
```

```
## [1] 0.3182711
```

```
length(which(condit == 3))/length(condit)
```

```
## [1] 0.04770979
```

Problem 3. Pseudo-random X

```
Y <- runif(n)
X <- sqrt(4*Y)
hist(X, freq = F, breaks = 100)
curve(x/2, col = "red", lwd = 2, add = T)
```

Histogram of X

