Stats for DS HW 5

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3.4.8

(a)

negative binomial

(b)

sample space = {5,6,7,...}
PMF = f(x) = choose(x-1, 4)$(0.05^{5)(0.95}$(x-5))

(c)

```
1 - pnbinom(35, 5, 0.05)
```

```
## [1] 0.9519717
```

3.4.19

(a)

Var(X1) = 2.6, Var(X2) = 3.8

(b)

```
0.6*(dpois(0, 2.6))+0.4*(dpois(0,3.8))
```

```
## [1] 0.05351246
```

(c)

P(by X2 | no errors) = P(by X2 and no errors)/P(no errors) =

```
0.4*dpois(0,3.8)/(0.6*(dpois(0, 2.6))+0.4*(dpois(0,3.8)))
```

```
## [1] 0.1672192
```

3.5.1

(a)

```
1 - pexp(4, 1/6)
```

```
## [1] 0.5134171
```

(b)

variance = $1/36$

```
qexp(0.95, 1/6)
```

```
## [1] 17.97439
```

(c)

(i)

```
1 - pexp(5, 1/6)
```

```
## [1] 0.4345982
```

(ii)

6 years, because the exponential distribution is memoryless.

3.5.8

(a)

```
1 - pnorm(600, 500, 80)
```

```
## [1] 0.1056498
```

(b)

```
qnorm(0.99, 500, 80)
```

```
## [1] 686.1078
```

4.2.3

(a)

```
0.15+0.135+0.12+0.3
```

```
## [1] 0.705
```

```
0.12+0.135
```

```
## [1] 0.255
```

(b)

f(x) = 0.42 for x=8, 0.31 for x=10, 0.27 for x=12, 0 otherwise f(y) = 0.48 for y=1.5, 0.405 for y=2, 0.115 for y=2.5

(c)

```
(.135+.12)/(.135+.12+.15)
```

```
## [1] 0.6296296
```

4.2.8

(a)

Solving the double integral with bounds 0 to 1.5 and x to 3-x (2eˆ(-x-y)) dydx results in 1-4eˆ-3 or about 0.80

(b)

marginal pdf of y is f(y) = (-2eˆ(-y))*((-2eˆ(-y))-1) for y>=0. marginal pdf of x is f(x) = 2eˆ(-2x) for x>=0