**#2. Expected Value by conditioning Problems - Solutions**

1. E(drive time)=.2(55)+.4(50)+.4(45)=49
2. E(X)=E(E(X|Ω))=, we know that Ω is uniform on the interval [5,45]. So for 5<t<45. We also know that X is exponential with mean Ω, so when Ω=t, the mean of X is t. That is . Putting this together:

E(X)=E(E(X|Ω))=

I could also say: E(X|Ω)= Ω so

 E(X)=E(E(X|Ω))= E(Ω)=25.

|  |  |  |  |
| --- | --- | --- | --- |
| Game | probability | distribution | mean |
| Cubs | .4 | N(50,16) | 50 |
| Steelers | .3 | Unif (20,120) | 70 |
| Red Sox | .2 | Expo. Mean 65 | 65 |
| Curling | .1 | 1. ith prob. 1
 | 24 |

E(X)=.4(50)+.3(70)+.2(65)+.1(24)

|  |  |  |  |
| --- | --- | --- | --- |
| Prob. | damage | payment | Expected payment |
| .04 | 1000X | 1000(X-1)+ | 3290.57 |
| .02 | 15000 | 14000 | 14000 |
| .94 | 0 | 0 | 0 |

We need to compute: . Because (X-1)+=0 if X<1, the integral starts at x=1: : . Integrating by parts we get=3.290566

Finally, E(payment)=.04(3290.57)+.02(14000)

Problem 7, section 4.7: f(x,y)=x+y, 0<x,y<1.

, so we need to compute the conditional density

Finally: