# Math 5068

Spring 2018

# *Examples: Lectures 14 & 15*

*Topics:*

* *Multiple Life: Joint Life Status (JLS) and Last Survivor Status (LSS)*
* *Force of Failure*
* *Expected Future Lifetime*
* *JLS/LSS Relationships*

1. Consider two independent lives with  and 
   * 1. What is the probability that exactly one of (*x*) and (*y*) will be alive at the end of *t* years?
     2. What is the probability that at least one of (*x*) and (*y*) will die in the next *t* years?
     3. What is the probability that (*x*) will survive the next *t* years and (*y*) will not?
     4. What is the probability that both lives will die in the next *t* years?
2. You are given:
   1.  and  are independent.

|  |  |  |
| --- | --- | --- |
| *k* | *qx+k* | *qy+k* |
| 0 | 0.08 | 0.10 |
| 1 | 0.09 | 0.15 |
| 2 | 0.10 | 0.2 |



1. Calculate 
2. Calculate 
3. For two lives with independent future lifetimes, you are given:
4. 
5. 
6. 
7. 
8. 
9. 

Calculate 

1. You are given:
2. 
3. 
4. 
5. 
6. 
7. 

For two independent lives aged 40, calculate the probability that the first death occurs after 6 years, but before 12 years.

1. For two independent lives age 55 and 60, you are given:
   1. The force of mortality for (55) is  *t* > 0;
   2. The force of mortality for (60) is  *t* > 0;

Calculate the expected amount of time to the first death.

1. Independent lives (x) and (y) have constant forces of mortality. You are given that:

o

* 1. 

o

* 1. 

o

Find 

1. (30) and (40) have independent future lifetimes and are subject to the mortality law for all x.

Calculate 

1. You are given:
   1. The survival function for males is , .
   2. Female mortality follows DeMoivre’s Law.
   3. At age 60, the female force of mortality is 60% of the male force of mortality.

For two independent lives, a male age 65 and a female age 60, calculate the expected time until the second death.

1. You are given the following mortality table:

|  |  |  |
| --- | --- | --- |
| *x* | *Male*  *qx* | *Female*  *qx* |
| 80 | 0.10 | 0.07 |
| 81 | 0.12 | 0.09 |
| 82 | 0.14 | 0.11 |
| 83 | 0.16 | 0.13 |
| 84 | 0.18 | 0.15 |

Kevin and Kira are a couple. Kevin, a male, is age 82, and Kira, a female, is age 80. The two lives are independent. Calculate the probability that the last death for this couple will occur within the third year from the current date.

1. Using the table from Example 9, calculate the probability that exactly one of the two lives is alive at the end of three years.
2. Future lifetimes for two lives age 40 are independent. The force of mortality for each life is:

 

Calculate the expected amount of time until the last death.

1. You are given:
2. (30) and (50) are independent lives, each subject to a constant force of mortality, 
3. 
4. Calculate 
5. Calculate 