B.1 Examples and Exercises

B.1.1 - Probability Functions

Slide 5/27:

Express the probability that a (30) dies between ages 40 and 45 using the cumulative distribution function.

Slide 7/27:

Express the probability that a (30) dies between ages 40 and 45 using the survival function.

Slide 9/27:

Write the probability that a 50 year old dies between ages 51 and 53 using the curtate future lifetime random variable.

Slide 10/27 (Exercise):

You are given a survival function $S_0(x) = 1 - 0.01x$ for $0 \leq x \leq 100$.

Determine the median future lifetime of a life aged 10.

B.1.2 - Actuarial Notation for Probabilities

Slide 18/27 (Exercise):

You are given ${}_{1|}q_{x+1} = 0.095$, ${}_{2|}q_{x+1} = 0.171$ and $q_{x+3} = 0.200$. Calculate $q_{x+1} + q_{x+2}$.

B.1.3 - Life Tables

Slide 25/27 (Exercise 1):

You are given ${}_{1|}q_{x+1} = 0.095$, ${}_{2|}q_{x+1} = 0.171$ and $q_{x+3} = 0.200$. Calculate $q_{x+1} + q_{x+2}$. (Hint: build a table)

Slide 26/27 (Exercise 2):

You are given the following:

A. The probability that a person age 20 will survive 30 years is 0.7.

B. The probability that a person age 45 will die within 5 years and that another person age 40 will survive 5 years is 0.0475.

C. The probability that a person age 20 will survive 20 years and that another person age 40 will die within 5 years is 0.04.

Calculate the probability that a person age 20 will survive 25 years.