

# STAT 472

Fall 2018

## Quiz 3

September 18, 2018

1. You are given the following two year select and ultimate mortality table:

$[x]$	$q_{[x]}$	$q_{[x]+1}$	$q_{x+2}$	$x+2$
90	0.1	0.2	0.3	92
91	0.12	0.25	0.5	93

If  $l_{[90]} = 100,000$ , calculate  $l_{[91]}$ .

2. You are given the following two year select and ultimate mortality table:

$[x]$	$q_{[x]}$	$q_{[x]+1}$	$q_{x+2}$	$x+2$
90	0.1	0.2	0.3	92
91	0.12	0.25	0.5	93

Deaths between integral ages follows a constant force of mortality.

Calculate  ${}_{1.7}q_{[90]+0.4}$ .

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If  $e_{92} = 2.00$ , calculate  $e_{[90]}$ .

2. Improving maintenance protocols will extend the lifetime of an industrial robot. The robot's mortality rates and improvement factors are given below:

$x$	$q(x,0)$	$\varphi(x,1)$	$\varphi(x,2)$
0	0.1	0.25	0.18
1	0.3	0.20	0.12
2	0.5	0.15	0.10

Calculate  $e_{\overline{0:\overline{3}}}$  for the robot.