

Each problem is worth 10 points. Show all work for full credit, and use correct notation. Simplify answers completely. See other side for additional problems.

1. For a double decrement table, given  $q_x^{(1)} = 0.3$ ,  $p_x^{(2)} = 0.8$  and  $q_x^{(2)} = 0.18$ , determine  $q_x^{(1)}$ .

2. You are given the double decrement table, where decrement  $d$  refers to death and decrement  $w$  refers to withdrawal:

$x$	$l_x^{(\tau)}$	$d_x^{(d)}$	$d_x^{(w)}$
50	1000	-	200
51	-	-	50
52	300	100	-

Determine

(a)  ${}_2p_{50}^{(\tau)}$

(b)  ${}_2|q_{50}^{(d)}$

3. You are given the double decrement table, where decrement  $d$  refers to death and decrement  $w$  refers to withdrawal:

$x$	$l_x^{(\tau)}$	$d_x^{(1)}$	$q_x^{(1)}$	$d_x^{(2)}$	$q_x^{(2)}$
95	-	600	-	-	0.10
96	-	-	0.40	-	0.20
97	-	-	0.75	300	0.25

Determine  ${}_{1|2}q_{95}^{(1)}$ .

4. For a triple decrement table, given  $\mu_x^{(1)}(t) = 0.15$ ,  $\mu_x^{(2)}(t) = 0.20$ , and  $\mu_x^{(3)}(t) = 0.65$  determine  ${}_{0.3|0.5}q_x^{(3)}$ .