

**MATH 3630 - Actuarial Mathematics I**  
**Fall 2016 - Valdez**  
**Quiz No. 6**  
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A whole life annuity-due with annual payments of \$1 is issued to a person age 97. You are given:

- $i = 3\%$ , and
- the following extract from a mortality table:

age $x$	97	98	99	100
$l_x$	100	80	50	0

Let  $Y$  be the present value random variable for this whole life annuity-due.

Calculate  $\text{Var}[Y]$ .

$v = \frac{1}{1.03}$

<u><math>k</math></u>	<u><math>P_r(K=k)</math></u>	<u><math>Y = \ddot{a}_{\overline{k+1} }</math></u>	<u><math>Y \times P_r(K=k)</math></u>	<u><math>Y^2 \times P_r(K=k)</math></u>
0	0.20	1	0.20	0.20
1	0.30	$1+v = 1.970874$	0.5912621	1.165303
2	0.50	$1+v+v^2 = 2.913470$	1.4567348	4.244153
			<u><math>\Sigma = 2.247997</math></u>	<u><math>\Sigma = 5.609456</math></u>

$$\begin{aligned}
 \text{Var}[Y] &= 5.609456 - (2.247997)^2 \\
 &= \underline{\underline{0.5559654}}
 \end{aligned}$$