**MATH 3630 - Actuarial Mathematics I**
**Fall 2017 - Valdez**
**Quiz No. 4**
**Monday, 23 October 2017**

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For a special whole life insurance issued to (44) with benefits payable at the end of the year of death, you are given:

- The benefits are \$2 for the first year and \$1 thereafter.
- Mortality in the first year follows a constant force $\mu = 0.01$ and after the first year, mortality follows the `Illustrative Life Table`.
- $i = 0.06$
- $Z$ is the present value random variable for this insurance.

Calculate Var[$Z$].

$p_{44} = e^{-.01}$

$q_{44} = 1 - e^{-.01}$

$v = \frac{1}{1.06}$

$E[Z] = 2vq_{44} + vp_{44}A^{ILT}_{45}$ (.20120)

$= 2\frac{1}{1.06}(1-e^{-.01}) + \frac{1}{1.06}e^{-.01}(.20120) = 0.2066966$

$E[Z^2] = 2^2v^2q_{44} + v^2p_{44}{}^2A^{ILT}_{45}$ (.06802) $= 0.09535765$

$Var[Z] = E[Z^2] - (E[Z])^2$

$= 0.09535765 - (0.2066966)^2$

$= 0.05263418$