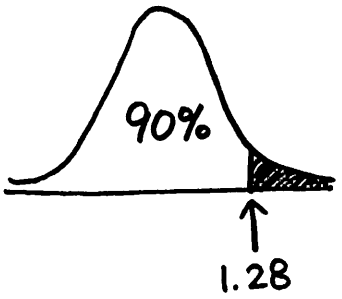
MLC #186



Y = Present Value of payments to an individual

S = Present Value of payments to the group

$$E(Y) = 500\ddot{a}_x = 500 \cdot \frac{1-A_x}{d} = 500 \cdot \frac{1-0.369131}{0.06/1.06} = 5{,}572.68$$

$$Var(Y) = 500^2 \cdot \frac{{}^2A_x - A_x^2}{d^2} = 500^2 \cdot \frac{0.1774113 - 0.369131^2}{(0.06/1.06)^2} = 3{,}211{,}124.333$$

$$S = Y_1 + Y_2 + \ldots + Y_{250}$$

$$E(S) = \sum_{i=1}^{250} E(Y_i) = E(Y_1) + \ldots + E(Y_{250}) = 250 \times 5572.68 = 1{,}393{,}170$$

$$Var(S) = \sum_{i=1}^{250} Var(Y_i) = Var(Y_1) + \ldots + Var(Y_{250}) = 250 \times 3{,}211{,}124.333 = 802{,}781{,}083$$

$$\sigma_S = \sqrt{Var(S)} = \sqrt{802781083} = 28{,}333$$

$$0.9 = Pr(S \le Fund) = Pr\left[\frac{S - 1393170}{28333} \le \frac{Fund - 1393170}{28333}\right]$$

$$Z = \frac{X-\mu}{\sigma}$$

$$= Pr\left[N(0,1) \le \frac{Fund - 1393170}{28333}\right]$$

$$1.28 = \frac{Fund - 1393170}{28333}$$

$$Fund = 1.28(28333) + 1393170$$

$$= 1.43 \text{ million } \textcircled{A}$$