

Question #209**Answer: E**

Let Y_{65} = present value random variable for an annuity due of one on a single life age 65.

$$\text{Thus } E(Y_{65}) = \ddot{a}_{65}$$

Let Y_{75} = present value random variable for an annuity due of one on a single life age 75.

$$\text{Thus } E(Y_{75}) = \ddot{a}_{75}$$

$$\begin{aligned} E(X) &= 50(2)\ddot{a}_{65} + 30(1)\ddot{a}_{75} \\ &= 100(9.8969) + 30(7.217) = 1206.20 \end{aligned}$$

$$\text{Var}(X) = 50 \times 2^2 \text{Var}[Y_{65}] + 30(1)^2 \text{Var}[Y_{75}] = 200(13.2996) + 30(11.5339) = 3005.94$$

$$\text{where } \text{Var}[Y_{65}] = \frac{1}{d^2} ({}^2A_{65} - A_{65}^2) = \frac{1}{(0.05660)^2} [0.23603 - (0.4398)^2] = 13.2996$$

$$\text{and } \text{Var}[Y_{75}] = \frac{1}{d^2} ({}^2A_{75} - A_{75}^2) = \frac{1}{(0.05660)^2} [0.38681 - (0.59149)^2] = 11.5339$$

$$\begin{aligned} 95^{\text{th}} \text{ percentile} &= E(X) + 1.645\sqrt{\text{Var}[X]} \\ &= 1206.20 + 1.645(54.826) \\ &= 1296.39 \end{aligned}$$