

## Question #72

Answer: A

Let  $Z$  be the present value random variable for one life.

Let  $S$  be the present value random variable for the 100 lives.

$$E(Z) = 10 \int_5^{\infty} e^{-\delta t} e^{-\mu t} \mu dt$$

$$= 10 \frac{\mu}{\delta + \mu} e^{-(\delta + \mu)5}$$

$$= 2.426$$

$$E(Z^2) = 10^2 \left( \frac{\mu}{2\delta + \mu} \right) e^{-(2\delta + \mu)5}$$

$$= 10^2 \left( \frac{0.04}{0.16} \right) (e^{-0.8}) = 11.233$$

$$\text{Var}(Z) = E(Z^2) - (E(Z))^2$$

$$= 11.233 - 2.426^2$$

$$= 5.348$$

$$E(S) = 100 E(Z) = 242.6$$

$$\text{Var}(S) = 100 \text{Var}(Z) = 534.8$$

$$\frac{F - 242.6}{\sqrt{534.8}} = 1.645 \rightarrow F = 281$$