

Last updated August 24, 2018.

1. [First Pass] You are given $S_0(x) = e^{-\frac{x^3}{12}}$, for $x \geq 0$.

Determine μ_x .

A. $-\frac{x^2}{4}$

B. $1 - \frac{x^2}{4}$

C. $\frac{x^2}{4}$

D. $\frac{x^2}{4}e^{-\frac{x^2}{12}}$

E. $-\frac{x^3}{12}$

2. [First Pass] You are given a life, aged 30, subject to a force of mortality given by:

$$\mu_x = 0.02 \cdot x^{0.5}, \text{ for } 20 \leq x \leq 50.$$

Determine the probability this life will survive 5 years and die during the following year.

- A. Less than 0.044
- B. At least 0.044, but less than 0.052
- C. At least 0.052, but less than 0.060
- D. At least 0.060, but less than 0.068
- E. At least 0.068

3. [First Pass] Which of the following functions can serve as a force of mortality?

1. Bc^x $B > 0, 0 < c < 1, x \geq 0$

2. $B(x+1)^{-0.5}$ $B > 0, x \geq 0$

3. $k(x+1)^n$ $k > 0, n > 0, x \geq 0$

A. 1 and 2 only

B. 1 and 3 only

C. 2 and 3 only

D. 1, 2 and 3

E. The correct answer not given by (A), (B), (C) or (D)

4. [SOA.MLC.155] Given:

(i) $\mu_x = F + e^{2x}, \quad x \geq 0$

(ii) ${}_{0.4}p_0 = 0.50$

Calculate F .

A. -0.20

B. -0.09

C. 0.00

D. 0.09

E. 0.20

5. [SOA.MLC.032] Given: The survival function $S_0(t)$, where

$$S_0(t) = \begin{cases} 1 & 0 \leq t < 1 \\ 1 - \frac{e^t}{100} & 1 \leq t < 4.5 \\ 0 & 4.5 \leq t \end{cases}$$

Calculate μ_4 .

A. 0.45

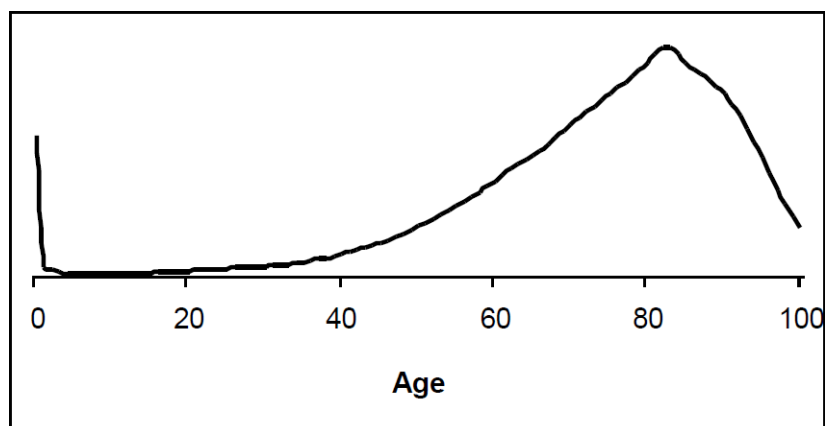
B. 0.55

C. 0.80

D. 1.00

E. 1.20

6. [SOA.MLC.106] The following graph is related to current human mortality:



Which of the following functions of age does the graph most likely show?

- A. μ_x B. $l_x\mu_x$ C. l_xp_x D. l_x E. l_x^2