Math 402 HW 2 Spring 2023. Due Friday, Feb. 3.

Math 402 webpage: (http://parker.ad.siu.edu/Olive/M402.html)

Problems from Ch. 10.

1) You are given two independent lives (x) and (y) where $x = 20$, $y = 40$ and the lifetimes of (x) and (y) follow De Moivre's law with $\omega = 100$. Find the probability that at least one life will survive the next 20 years.

Hints: This is a ch. 10 problem. See exam 1 review 48) i) with p's. Assume newborn lives follow De Moivre's law with $\omega = 100$, so $T_x \sim U(0, 80)$.

2) Let T_x and T_y be independent future lifetime random variables, each with an exponential distribution with mean 20. Find the value of $Var(T_{xy})$.

Hint: $T_{xy} \sim EXP(\mu_x + \mu_y)$ where $E(T_x) = 1/\mu_x$.

3) Let T_{80} and T_{85} be independent random variables with uniform distributions with $\omega = 100$. Find the probability that the second failure occurs five years from now.

Hint: want $F_{T_{\overline{80:85}}}(5) = {}_5q_{\overline{80:85}}$. Assume $X \sim U(0, 100)$, so $T_x \sim U(0, \omega - x)$. Then $T_{80} \sim U(0, 20)$ and $T_{85} \sim U(0, 15)$.

4) You are give T is the future lifetime variable, $\mu_t = \mu(t) = \mu, t \geq 0$ and $V(T) = 100$. If $X = \min(T, 10)$, find $E(X)$.

Hint: SOA MLC practice problem 189.

(https://www.soa.org/4934f7/globalassets/assets/files/edu/edu-2014-spring-mlc-ques.pdf) has the SOA MLC practice problems and (https://www.soa.org/globalassets/assets/files/edu/edu-2014-spring-mlc-sol.pdf) has the solutions. Google "soa mlc sample questions"

(https://www.casact.org/exams-admissions/exam-results-summary-exam-statistics/ past-exams-pass-marks) and (https://www.soa.org/education/exam-req/syllabus-study-materials/edu-multiple-choice-exam/) have some old professional exams. Google "cas exam 3L"