Notation: Ab is "A bar", "AA" is A computed at twice the force of interest. I am making use of the formulas in "Important formulas" posted on the class web page. Things like A40 and AA40 are read off of the ILT (Illustrative Life Table). iod is i/delta, iiodd is i/del at twice the force of interest. z975 is the 97.5 th percentile of the normal distribution from the table. Note that the problems are not in order.

De Moivre (Problem 4)

> $AbDem := (w, x, n, del) \rightarrow \frac{(1 - \exp(-del \cdot n))}{del \cdot (w - x)}$

$$AbDem := (w, x, n, del) \rightarrow \frac{1 - e^{-del\, n}}{del\ (w - x)} \quad (1)$$

> $ADem := (w, x, n, del) \rightarrow \frac{del \cdot AbDem(w, x, n, del)}{(\exp(del) - 1)}$;

$$ADem := (w, x, n, del) \rightarrow \frac{del\, AbDem(w, x, n, del)}{e^{del} - 1} \quad (2)$$

> $A1 := ADem(100, 40, 60, .05)$

$$A1 := 0.3088851892 \quad (3)$$

> $A2 := ADem(100, 40, 60, .1)$

$$A2 := 0.1580793859 \quad (4)$$

> $V := A2 - A1^2$

$$V := 0.06266932579 \quad (5)$$

> $A1 := AbDem(100, 40, 60, .05)$

$$A1 := 0.3167376438 \quad (6)$$

> $A2 := AbDem(100, 40, 60, .1)$

$$A2 := 0.1662535413 \quad (7)$$

> $V := A2 - A1^2$

$$V := 0.0659308063 \quad (8)$$

Problem 5

> $Abexpn := (m, n, del) \rightarrow m \cdot \frac{(1 - \exp(-(del + m) \cdot n))}{del + m}$

$$Abexpn := (m, n, del) \rightarrow \frac{m\left(1 - e^{-(del + m)\, n}\right)}{del + m} \quad (9)$$

> $Abexp := (m, del) \rightarrow \frac{m}{m + del}$

$$Abexp := (m, del) \rightarrow \frac{m}{m + del} \quad (10)$$

> $V := Abexp(.02, .1) - Abexp(.02, .05)^2$

$$V := 0.08503401365 \quad (11)$$

Problem 2

> $V := 500^2 \cdot (AA40 - A40^2) \cdot 100;\ sig := \sqrt{V};\ m := 500 \cdot 100 \cdot A40$

$$V := 5.651464400\ 10^5$$
$$sig := 751.7622230$$
$$m := 8066.00000 \quad (12)$$

> $S := m + sig \cdot z975$

$$S := 9539.453957 \quad \textbf{(13)}$$

Problem 3

> $V := 500^2 \cdot \left(iiodd \cdot AA40 - (iod)^2 \cdot A40^2 \right) \cdot 100;\ sig := \mathrm{sqrt}(V);\ m := 500 \cdot 100 \cdot A40 \cdot iod$

$$V := 5.995894465\ 10^5$$

$$sig := 774.3316127$$

$$m := 8305.630150 \quad \textbf{(14)}$$

> $S := m + sig \cdot z975$

$$S := 9823.320111 \quad \textbf{(15)}$$