Page 896: **Let p = 1 - q.**

$$\hat{p} = \exp[-(b-a)\, d / e] = \exp[-\frac{d}{e / (b-a)}].$$

$$Var[\hat{p}] = Var[\hat{q}] = \hat{p}^2 (b - a)^2 d / e^2.$$

Similar to one term of the variance of the the Nelson-Aalen estimator with:

d ⇔ s = number who die.

e / (b-a) ⇔ r = number in the risk set.

$$\hat{S}(t_j) = \exp[-\sum_{i=1}^{j} \frac{s_i}{r_i}]. \qquad Var[\hat{S}(t_j)] = \hat{S}(t_j)^2 \sum_{i=1}^{j} \frac{s_i}{r_i^2}.$$

p.918: $1 - \exp[-d/e]$

page 1054: $$141.079 \{q^8 / 8 - q^9 / 9\} \Big]_{q = 0.6}^{q = 0.8} = 0.72.$$

Page 1057: **6.43. B.** If b were 300, then claim sizes are uniform from 300 to 400, and we could observe a claim of size 300.

If b were 200, then claim sizes are uniform from 200 to 300, and we could observe a claim of size 300.

b can be 200, 300, or anything in between.

Given $200 \le b \le 300$, the chance of the observation given b is 1/100.

$\pi(b) = e^{-b/80} / 80$.

The probability weight is: $(e^{-b/80} / 80) (1/100)$.

$\Rightarrow$ Posterior distribution of b is proportional to:

$e^{-b/80}$, $200 \le b \le 300$.

$$\int_{200}^{300} e^{-b/80} \, db = -80 \, e^{-b/80} \Big]_{b=200}^{b=300}$$

$= 80 (e^{-2.5} - e^{-3.75}) = 4.685$.

Thus the posterior distribution of b is:

$$\frac{e^{-b/80}}{4.685},\ 200 \le b \le 300.$$

Given b, the mean severity is: b + 50.

$\Rightarrow$ The expected value of the next claim from

the same insured is: $\int_{200}^{300} (b + 50)\ \frac{e^{-b/80}}{4.685}\ db =$

$$\frac{1}{4.685} \int_{200}^{300} b\ e^{-b/80}\ d + 50 \int_{200}^{300} \frac{e^{-b/80}}{4.685}\ db =$$

$$\frac{1}{4.685} (-80b\ e^{-b/80} - 80^2\ e^{-b/80})\Big]_{b=200}^{b=300} + (50)(1)$$

= 239.845 + 50 = **289.845**.

<u>Comment</u>: The integral of the posterior density of b over its support has to be one.

See 4, 11/01, Q.14 (2009 Sample Q.64).

page 1180:

EPV = $E[\beta + \beta^2] = E[\beta] + E[\beta^2] =$

$E[\beta] + Var[\beta] + E[\beta]^2$

$= 0.2313 + 0.01589 + 0.2313^2 = 0.3007.$

Page 1451: $m = 100 - 4 = 96.$

Page 1473: $\lambda_0 = 2.554 + (-0.5108)(0) = 2.554.$