2, sol. 4: $\pi(\lambda) = \lambda^3 e^{-200\lambda} 0.005^{-4} / \Gamma[4]$. Final solution is OK.

6, question 15: since the smallest left truncation point is 500, what we are really estimating is S(10,000) / S(500) rather than S(10,000).

9, solutions 34 & 35: For death, treating any lapses as censoring from above:

ti	si	ri	(ri-si)/ri	S(ti) / S(70)
70.3	1	20	0.9500	0.9500
71.1	1	19	0.9474	0.9000
73	1	16	0.9375	0.8438
73.4	2	35	0.9429	0.7955
74.6	1	31	0.9677	0.7699

${}_5q_{70}'^{(d)}$ = 1 - S(75) / S(70) = 1 - 0.7699 = **0.2301**.

For lapses, treating any deaths as censoring from above:

ti	si	ri	(ri-si)/ri	S(ti) / S(70)
72.3	1	18	0.9444	0.9444
72.5	1	17	0.9412	0.8889
73.4	1	35	0.9714	0.8635
73.8	1	32	0.9688	0.8365

${}_5q_{70}'^{(l)}$ = 1 - S(75) / S(70) = 1 - 0.8365 = **0.1635**.

14, sol. 4: $k_{500}(500) = (0.003)\{1 - \left(\frac{500 - 500}{250}\right)^2\} = 0.003$.

14, sol. 30, in the comment: The variance of the aggregate loss is: $(0.8)(5^2) + (9^2)(0.48) = 58.88$.
Thus the Normal Approximation for the probability that the aggregate exceeds 14 is:
$1 - \Phi[(14 - 7.2)/7.67] = 1 - \Phi[0.89] = 18.67\%$.

15, solution 11: $\frac{\partial \ln[f(x)]}{\partial q} = -\frac{1 - x}{1 - q} + \frac{x}{q}$. $\frac{\partial^2 \ln[f(x)]}{\partial q^2} = -\frac{1 - x}{(1 - q)^2} - \frac{x}{q^2}$. E[X] = q.

Thus $E[\frac{\partial^2 \ln[f(x)]}{\partial q^2}] = -\frac{1 - q}{(1 - q)^2} - \frac{q}{q^2} = -\frac{1}{(1-q)} - \frac{1}{q} = -\frac{1}{q (1-q)}$.

(Fisher's) Information = $-n\, E[\frac{\partial^2 \ln[f(x)]}{\partial q^2}] = (-200) \{-\frac{1}{q (1-q)}\} = \frac{200}{q (1-q)}$.

The fitted q is 40/200 = 0.2. Thus the information is: 200 / {(0.2)(0.8)} = 1250.
Alternately, the sum of 200 independent Bernoullis is a Binomial with m = 200.

$f(x) = \frac{200!}{x!\,(200 - x)!} (1-q)^{200-x} q^x$.

ln f(x) = ln[200!] - ln[x!] - ln{(200-x)!] + (200-x)ln[1 - q] + x ln[q].

$\frac{\partial \ln[f(x)]}{\partial q} = -\frac{200 - x}{1 - q} + \frac{x}{q}$. $\frac{\partial^2 \ln[f(x)]}{\partial q^2} = -\frac{200 - x}{(1 - q)^2} - \frac{x}{q^2}$.

For the Binomial, E[X] = 200q.

Thus $E[\frac{\partial^2 \ln[f(x)]}{\partial q^2}] = -\frac{200 - 200q}{(1 - q)^2} - \frac{200q}{q^2} = -200 \{\frac{1}{(1-q)} + \frac{1}{q}\} = -\frac{200}{q (1-q)}$.

We have a sample of size one from the Binomial.

(Fisher's) Information = $-n\, E[\frac{\partial^2 \ln[f(x)]}{\partial q^2}] = (-1)\{-\frac{200}{q (1-q)}\} = \frac{200}{q (1-q)} = \frac{200}{(0.2)(0.8)} = 1250$.

15, question 15: unfortuantely it is the same as Exam #14 Question 30.

15, question 18: one could have -ln[0.8] in the loglikelihood.
Thus this question would have been better to ask for the equation that needs to be solved for the maximum likelihood tau, in other words what one gets if the one sets the derivative of the loglikelihood with respect to tau equal to zero.

16, solution 18: Similar to Q. 18.4**2**

17, Question 6: ignore the point value given to this question.

17, solution 23: Thus the **fourth** claim occurs at: 0.9939 + 0.0456 = 1.0395 > 1.