Errata and updates for ASM Exam 3L (Tenth Edition) sorted by page

[6/8/2010] On page xi, on the first line under "Old exam question", delete www after "questions".

[7/7/2010] On page 32, in the table at the bottom of the page, interchange "Policyholders" and "Claims".

[5/25/2010] On page 56, footnote 1 is missing. It reads:

We will discuss bias in a later lesson, but what you need to know here is that dividing the sum of squares by $n-1$ instead of by n leads to the unbiased sample variance.

[7/22/2010] On page 118, in Example 8B, on the first line, replace "is 0.2" with "with mean 0.2".

[6/2/2010] On page 175, in exercise 12.19, on the third line, σ^2 should be σ_2^2.

[8/22/2010] On page 197, the last four lines of the solution to Quiz 13-2 are incorrect. The correct lines are:

$$s_{\hat{\beta}}^2 = \frac{s^2}{\sum x_i^2} = \frac{1.175}{20} = 0.05875$$
$$T = \frac{0.65}{\sqrt{0.05875}} = 2.682$$

At 6 degrees of freedom, $2.447 < 2.682 \leq 3.143$, where 2.447 is the critical value at 5% significance and 3.143 is the critical value at 2% significance. Therefore, the answer is **(C)**

[8/11/2010] On page 377, on the first line of Subsection 24.2.1, change "a a positive real number" to "δ a positive real number".

[8/23/2010] On page 215, on the second line of the answer to part 2 of Example 16A, change $\Pr(Y_1 < 3)$ to $\Pr(Y_5 < 3)$.

[7/22/2010] On page 232, on the sixth line, change "on starts" to "one starts".

[6/9/2010] On page 232, fourth line of Section 17.3, change the three arguments x to t:

$s_{T(x)}(t) = \Pr\Big(T(x) > t\Big)$. (*Models for Quantifying Risk* uses $S(t)$ instead of $s(t)$.)

[7/22/2010] On page 232, third line from the bottom, change $X \geq 40$ to $X > 40$.

[7/15/2010] On page 239, in the solution to exercise 17.9, on the third line, ${}_{15}p_{50}$ is 0.54, not 0.6.

[5/28/2010] On pages 245 and 249, in formula (18.8), change the three t's in the integrand to s's:

$$ {}_tq_x = \int_0^t {}_sp_x\,\mu_x(s)\mathrm{d}s $$

[5/28/2010] Page 249: see errata for page 245.

[6/28/2010] On page 260, in the solution to exercise 18.23, 3 lines from the end, change "legs of lengths 0 and 1" to "legs of length 0.5 and 1".

[5/28/2010] On page 281, on the second to last displayed line, the first ${}_{50}p_{20}$ should be ${}_{50}q_{20}$.

[6/9/2010] On page 301, in the solution to Quiz 20-1, a negative sign is missing on the right of the first displayed line, and the second displayed line's terms should be reversed:

$$\int_{50}^{50+t} \mu_x\,\mathrm{d}x = -\ln(10-\sqrt{x})\Big|_{50}^{50+t}$$

$$= \ln(10 - \sqrt{50}) - \ln(10 - \sqrt{50+t})$$

[5/28/2010] On page 305, in equation (21.5) and (21.6), change $e_{x:\overline{n-m}|}$ to $e_{x+m:\overline{n-m}|}$ (once in each equation).

[8/2/2010] On page 308, in Table 21.1, replace formula (7.6) with $= e_{x:\overline{m-1}|} + {}_m p_x (1 + e_{x+m:\overline{n-m}|}), \quad m < n$.

[5/25/2010] On page 341, in the solution to exercise 22.14, on the 6th line, change $T^2 \wedge 2$ to $(T \wedge 2)^2$.

[6/28/2010] On page 344, in the solution to exercise 22.23, on the second line, delete the period in 7,126,0.36.

[6/14/2010] On page 354, last displayed line of page, put a bar on A_{65}.

[6/14/2010] On page 372, in the solution to exercise 23.31, on the first displayed line, change 0.4 to 0.04.

[6/14/2010] On page 378, on the first displayed line, change a in the exponent to δ.

[8/12/2010] On page 422, on the second to last line of the solution to Quiz 25-2, put an equals sign between (0.09476) and 0.01634.

[8/17/2010] On page 425, fourth line of answer to Example 26A, replace $\omega = 70$ with $\omega - x = 70$.

[6/14/2010] On page 426, on the third line of the answer to Example 26C, replace the two subscripts 30 with 40.

[8/4/2010] On page 442, in the solution to Quiz 25-1, on the last line, change the two subscripts from 50 to 60: ${}_{10}p_{60} - {}_{20}p_{60}$.

[8/18/2010] On page 450, in formula (27.13), delete the 0 in the first subscript.

[8/31/2010] On page 543, in the solution to exercise 30.24, on the fourth line, the lower limit of the sum should be 0 instead of 1.

[9/3/2010] On page 615, in the solution to exercise 33.7, on the third line, delete one of the "is to observe"'s.

[8/25/2010] On page 624, the solution to exercise 33.39 is incorrect. The correct solution is

At issue, the present value of premiums is $\pi \ddot{a}_{20:\overline{10}|}$, and the annuity-due may be valued as

$$\ddot{a}_{20:\overline{10}|} = \sum_{k=0}^{9} v^k \, {}_k p_{20} = \sum_{k=0}^{9} \left(\frac{0.99}{1.05}\right)^k = \frac{1-(0.99/1.05)^{10}}{1-0.99/1.05} = 14.01948$$

The present value of benefits can be split into annuity benefits and refund of premium benefits. The present value of a 10-year deferred life annuity of 1 is

$$\ddot{a}_{30} = \frac{1+i}{q+i} = \frac{1.05}{0.06} = 17.5$$

$${}_{10|}\ddot{a}_{20} = v^{10} \, {}_{10}p_{20} \, \ddot{a}_{30} = \left(\frac{0.99}{1.05}\right)^{10} (17.5) = 9.716212$$

So the present value of a 10-year deferred life annuity of 1000 is 9716.212.

The present value of the refund of premium benefits, since the premiums are refunded with interest, is the probability of death in the first year times 0.5π, plus the probability of death in the second year times π, etc. Due to the constant rate of mortality, this is an increasing annuity-certain. Calling its present

value R,

$$\begin{aligned} R &= 0.5\pi \sum_{k=1}^{10} k \,{}_{k|}q_{20} \\ &= 0.005\pi \sum_{k=1}^{10} k(0.99^{k-1}) \\ &= 0.005\pi(I\ddot{a}_{\overline{10}|}) \end{aligned}$$

where $d = 0.01$ for the increasing certain annuity-due. The formula for the increasing certain annuity-due is

$$\begin{aligned} (I\ddot{a})_{\overline{10}|} &= \frac{\ddot{a}_{\overline{10}|} - 10v^{10}}{d} \\ \ddot{a}_{\overline{10}|} &= \frac{1-0.99^{10}}{0.01} = 9.56179 \\ (I\ddot{a})_{\overline{10}|} &= \frac{9.56179 - 10(0.99^{10})}{0.01} = 51.7972 \end{aligned}$$

so the value of the premium refund is $0.005(51.7972)\pi = 0.258986\pi$. Equating the premiums with the benefits,

$$\begin{aligned} 14.01948\pi &= 9716.212 + 0.258986\pi \\ \pi &= \frac{9716.212}{14.01948 - 0.258986} = \boxed{\mathbf{1291.23}} \end{aligned}$$

[8/23/2010] On page 714, in the solution to exercise 38.7, on the fourth line, put a double-dot over $a_{x:\overline{3}|}$.