Some Errors in the Solution Manual

2.11(b) There are typos in the solution. The answer for the density should be $\sqrt{\dfrac{2}{\pi}}\, e^{-y^2/2}\,, y \geq 0.$

2.24(b) The variance should be $(n^2 - 1)/12$.

3.2(a) Change $P(X = 0|M = 100, N = 6, K)$ to $P(X = 0|N = 100, M = 6, K)$.

3.8(b) The normal approximation for integer-valued random variables is typically improved by using the continuity correction: $P(X > N) = P(X \geq N + 1) \approx P(X^* \geq N + 1 - .5) = P(X^* \geq N + .5)$ where X^* is a normal random variable with the same mean and variance as X. In this problem, the result of using the continuity correction is that

$$\frac{N + .5 - 500}{\sqrt{250}} = 2.33 \;\Rightarrow\; N \approx 536.34\,.$$

If we round up to ensure that the probability is less than .01, we get $N = 537$. The exact probabilities computed using the Binomial pmf in R are $P(X > 537) = 0.008831116$ and $P(X > 536) = 0.01046356$, so that $N = 537$ is the correct answer. The normal approximation with the continuity correction gives $PX > 537) \approx 0.008853033$ and $P(X > 536) \approx 0.01048671$, which are very close to the exact answers.

3.13(b) The correct variance is

$$\text{Var}X_T = \frac{r(1-p) + r^2(1-p)^2}{p^2(1-p^r)} - \left[\frac{r(1-p)}{p(1-p^r)}\right]^2 .$$

3.23(bc) There are typos in the answers, but the mean and variance given in the appendix (Table of Common Distributions) is correct. Note that the mean does not exist for $\beta \leq 1$ and the variance does not exist for $\beta \leq 2$.

3.25 There is a typo in the solution. After "Therefore from the definition of derivative", the second equals sign should be a multiplication sign.

3.27 Comment: A density $f(x)$ will be unimodal if its derivative $f'(x)$ has one sign change, going from + to −. It will also be unimodal (with mode at the left endpoint of the support) if the derivative is always negative. It will be unimodal (with mode at the right endpoint of the support) if the derivative is always positive.

3.27(b) The solution in the manual is only correct for $\alpha > 1$. For $0 < \alpha \leq 1$, the density is unimodal with mode at zero.

3.27(d) The solution is correct if both $\alpha > 1$ and $\beta > 1$. If both $\alpha < 1$ and $\beta < 1$, then the density is **not** unimodal; the density has two peaks (at $x = 0$ and $x = 1$). If $\alpha < 1$ and $\beta \geq 1$, then it is unimodal with mode at $x = 0$. If $\alpha \geq 1$ and $\beta < 1$, then it is unimodal with mode at $x = 1$. If $\alpha = \beta = 1$, then the density is uniform; it is unimodal and any value $x \in [0, 1]$ can be taken as the mode.