# Errata file for "Auction Theory: Introductory Exercises with Answer Keys" Springer

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1. **Chapter 1.**

   - Exercise 1.7. The fifth expression should read

$$\begin{aligned} R^2 &= -\lim_{x\to\infty}\frac{\frac{\partial x}{\partial x}}{\frac{\partial \exp(2\lambda x)}{\partial x}} - \frac{1}{2\lambda}\left[\exp\left(-2\lambda x\right)\right]_0^{\infty} \\ &= -\lim_{x\to\infty}\frac{1}{2\lambda\exp\left(2\lambda x\right)} - \frac{1}{2\lambda}\left[\lim_{x\to\infty}\exp\left(-2\lambda x\right) - 1\right] \\ &= \frac{1}{2\lambda} \end{aligned}$$

2. **Chapter 2.**

   - Exercise 2.4.
     - Page 37. Line 20 should read as "Differentiate with respect to $x_i$, ..."
     - Page 38 should have $b'\left(v_i\right)$ replaced by $b_i'\left(v_i\right)$ such that
       - The second expression should read as

$$-\left[F(v_i)^{N-1}\right] + (N-1)\,F\left(v_i\right)^{N-2} f\left(v_i\right)\frac{1}{b_i'\left(v_i\right)}(v_i - x_i) = 0.$$

       - The third expression should read as

$$(N-1)\,F\left(v_i\right)^{N-2} f\left(v_i\right) v_i - (N-1)\,F\left(v_i\right)^{N-2} f\left(v_i\right) x_i = F\left(v_i\right)^{N-1} b_i'\left(v_i\right)$$

       - The fourth expression should read as

$$F\left(v_i\right)^{N-1} b_i'\left(v_i\right) + (N-1)\,F\left(v_i\right)^{N-2} f\left(v_i\right) x_i = (N-1)\,F\left(v_i\right)^{N-2} f\left(v_i\right) v_i$$

       - Line 5 should read "The left side is $\frac{\partial\left[F(v_i)^{N-1} b_i(v_i)\right]}{\partial v_i}$,..."
       - The fifth expression should read as

$$\frac{\partial\left[F\left(v_i\right)^{N-1} b_i\left(v_i\right)\right]}{\partial v_i} = (N-1)\,F\left(v_i\right)^{N-2} f\left(v_i\right) v_i$$

3. **Chapter 4.**

- Exercise 4.1, page 128. The third displayed equation should read

$$f(b) = \frac{1}{v(N-1)} \left(\frac{b}{v}\right)^{-\frac{N-2}{N-1}}$$

- Exercise 4.2, page 130.
  - The second displayed equation should read as

$$\frac{v_i}{b_i'(v_i)} - 1 = \frac{v_i - b_i'(v_i)}{b_i'(v_i)} = 0$$

  - The fourth displayed equation should read

$$b_i(v_i) = \int_0^{v_i} x dx$$

  - The fifth displayed equation should be

$$b_i(v_i) = \left[\frac{1}{2}x^2\right]_0^{v_i} = \frac{1}{2}v_i^2.$$

- Exercise 4.3
  - Page 131. First displayed equation should read

$$u_i(b_i, b_{-i}, v_i) = \begin{cases} v_i - b_i & \text{if } b_i > \max\limits_{j \neq i} b_j \\ \frac{v_i}{k} - b_i & \text{if } b_i = \max\limits_{j \neq i} b_j \\ -b_i & \text{if } b_i < \max\limits_{j \neq i} b_j \end{cases}$$

  - Page 132. The derivative in line 15 should be $dF(x)^{N-1} = (N-1)F(x)^{N-2} f(x) dx$.
  - Page 133. The derivative in line 12 should be $dF(x)^{N-1} = (N-1)x^{N-2} dx$.
  - Page 135. Please add subscripts $i$ to all $b_i^{FPA}(v_i)$ and $b_i^{APA}(v_i)$ in part (e).
  - Page 136. The formula in the fourth line should read $f(x) \equiv \frac{\partial F(x)}{\partial x} = \lambda \exp(-\lambda x)$
- Exercise 4.6
  - Page 141. The last displayed equation should read

$$R^{APA} = 2\int_0^{+\infty} v_i [1 - F(v_i)] [F(v_i)]^{2-2} f(v_i) dv_i$$

  - Page 142. The first displayed equation should read

$$= 2\lambda \int_0^{+\infty} v_i \exp(-2\lambda v_i) dv_i$$

- Exercise 4.9, page 139. Line 10 should refer to Exercise 4.4 not Exercise 4.3.
- Exercise 4.7, page 145, line 10 should read "...bid more aggressively under the second-price all-pay auction for all valuations ... "
- Exercise 4.8, page 149, part (f). The explanation after the second displayed equation should read "which simplifies to $p\delta^t \pi^m = (1-p)\delta^t c$, or $p\pi^m = (1-p)c$, yielding probability $p^* = \frac{c}{\pi^m + c}$. This probability is increasing in the waiting cost, $c$, since $\frac{\partial p^*}{\partial c} = \frac{\pi^m}{(\pi^m + c)^2} > 0$. Intuitively, as the cost of waiting increases, every firm is less willing to stay in the industry."

4. **Chapter 5.**

- Exercise 5.1, page 167. Line 12 should read "... a bid equal to his valuation when he has the ..."

- Exercise 5.3, page 171.
  - The third expression should read

$$\frac{\partial b_i(v_i)}{\partial N} = -\frac{v_i}{(N-2)^2} < 0.$$

  - The last line should read "... the $45^0$-line from above".
  - Exercise 5.5, page 180. Line 23 should read "k$^{th}$-price" not "all-pay" auction.

5. **Chapter 6.**

- Exercise 6.1
  - Page 190, the third line of the third displayed equation should have $v_i^{N+1}$ not $v^{N+1}$.
  - Page 192, line 10 "these four auction formats".
- Exercise 6.4, page 197, line 17 to 18 should read "... but that of the first-price auction lies above (below) that of the second-price auction below (above) the expected value of the bid. "
- Exercise 6.5.
  - Page 198. At the top of the page, question (a) should read "Consider a generic auction format. Find bidder $i$'s expected utility from participating in this auction."
  - Page 200. The second displayed equation should read

$$\begin{aligned} E\left[m^A(v_i)\right] &= \int_0^1 \frac{N-1}{N} y^N dy \\ &= \frac{N-1}{N}\int_0^1 y^N dy \\ &= \frac{N-1}{N}\left[\frac{y^{N+1}}{N+1}\right]_0^1 \\ &= \frac{N-1}{N}\frac{1}{N+1} \end{aligned}$$

6. **Chapter 9.**

- Exercise 9.6, page 250.
  - Expression 1 should read $v_B(\alpha_1 - \alpha_2) + v_C\alpha_2$.
  - Expression 2 should read $v_B\alpha_1 + v_C\alpha_2 > v_B(\alpha_1 - \alpha_2) + v_C\alpha_2$.
  - Line 8 should read "simplifies to $v_B\alpha_2 > 0$ "