Errata for the 31st edition of *Standard Mathematical Tables and Formulae*

LAST UPDATED: June 11, 2005

NOTES:

1 Due to our procedures for verifying errata, the date that an entry is updated may be significantly later than the date that the errata was brought to our attention.
2 Sometimes many contributors bring the same errata to our attention.
3 The .pdf version of this errata list include an index of dates (see page 7) of when the errata were updated.
4 The latest errata is available from `http://www.mathtable.com/errata/`.

ERRATA:

1 **NEGATIVE INTEGER POWERS**, **1.2.12**, page 23. The first line now has

it is defined for $\operatorname{Re} k > 1$

This is incorrect, it should have been

it is defined for $\operatorname{Re} n > 1$

(Thanks to Martin Gotz for correcting this error.)

This entry last updated 10 June 2005.

2 **NEGATIVE INTEGER POWERS**, **1.2.12**, page 24. Some of the values of the zeta function are incorrect:

expression	old incorrect value	correct value
$\zeta(2)$	$1.644934066\boxed{9}$	$1.644934066\boxed{8}$
$\zeta(10)$	$1.000994575\boxed{2}$	$1.000994575\boxed{1}$
$\zeta(14)$	$1.000061248\boxed{2}$	$1.000061248\boxed{1}$

(Thanks to Harvey P. Dale for correcting this error.)

This entry last updated 23 May 2004.

3 **DOT, SCALAR, OR INNER PRODUCT**, **2.5.6**, page 133. The first line now has

> The *dot* (or *scalar* or *inner product*) of

This is incorrect, it should have been

> The *dot* (or *scalar* or *inner*) *product* of

(Thanks to Won-seok Lihh for correcting this error.)

This entry last updated 10 June 2005.

4 **VECTOR OR CROSS PRODUCT**, **2.5.7**, page 135. Item 1 now begins

> The *vector* (or *cross product*) of

This is incorrect, it should have been

> The *vector* (or *cross*) *product* of

(Thanks to Won-seok Lihh for correcting this error.)

This entry last updated 10 June 2005.

5 **Facts about rings**, **2.7.3.2**, page 165. The following definition of the quaternions should be added after item 8:

> Quaternions are four-vectors $q = (q_0, q_1, q_2, q_3) = (q_0, \mathbf{q})$ with the following properties:
>
> (a) non-commutative multiplication rule: $p \star q = (q_0, q_1, q_2, q_3) \star (p_0, p_1, p_2, p_3) = \begin{bmatrix} p_0q_0 - p_1q_1 - p_2q_2 - p_3q_3 \\ p_1q_0 + p_0q_1 + p_2q_3 - p_3q_2 \\ p_2q_0 + p_0q_2 + p_3q_1 - p_1q_3 \\ p_3q_0 + p_0q_3 + p_1q_2 - p_2q_1 \end{bmatrix} = (p_0q_0 - \mathbf{p}\cdot\mathbf{q}, p_0\mathbf{q} + q_0\mathbf{p} + \mathbf{p}\times\mathbf{q})$
>
> (b) the inner product: $p \cdot q = (q_0, q_1, q_2, q_3) \cdot (p_0, p_1, p_2, p_3) = p_0q_0 + p_1q_1 + p_2q_2 + p_3q_3 = p_0q_0 + \mathbf{p}\cdot\mathbf{q}$
>
> (c) the conjugation rule: $\overline{q} = (q_0, -q_1, -q_2, -q_3) = (q_0, -\mathbf{q})$

This entry last updated 10 June 2005.

6 **BALLS INTO CELLS**, **3.3.2**, page 207. Line 2 of the example now has

> … and $\{a, b\boxed{, c}\}$ denote the names of the cells …

This is incorrect, it should have been

> … and $\{a, b\}$ denote the names of the cells …

(Thanks to Francis Loranger for correcting this error.)

This entry last updated 10 June 2005.

7 **The mixed zero sum game**, **3.9.1.2**, page 276. Near the bottom of item number 4 we now have

$$\boxed{\text{maximize}} \quad x_1' + x_2' \quad \text{subject to} \ldots$$

This is incorrect, it should have been

$$\boxed{\text{minimize}} \quad x_1' + x_2' \quad \text{subject to} \ldots$$

(Thanks to Dan Morales for correcting this error.)

This entry last updated 10 June 2005.

8 **REGULAR POLYGONS**, **4.5.3**, page 324. Presently the book has

$$\begin{aligned} \text{area} &= \frac{1}{4}ka^2 \cot \frac{180^\circ}{k} = kr^2 \tan \frac{180^\circ}{k} \\ &= \boxed{\frac{1}{2}kR^2 \sin \frac{360^\circ}{k}}, \end{aligned}$$

This is incorrect, it should have been:

$$\begin{aligned} \text{area} &= \frac{1}{4}ka^2 \cot \frac{180^\circ}{k} = kr^2 \tan \frac{180^\circ}{k} \\ &= \boxed{\frac{s^2}{k} \cot \frac{360^\circ}{k} = rs}, \end{aligned}$$

(Thanks to John W. Dyer for correcting this error.)

This entry last updated 23 May 2004.

9 **Spherical half angle formulae**, **4.19.2.5**, page 370. The expression "$(\tan r)^2$" in the first line should be removed since r is not defined in this section.

(Thanks to Michael Pender for correcting this error.)

This entry last updated 23 May 2004.

10 **Spherical half angle formulae**, **Section 4.19.2.6**, page 371 The expression "$(\tan R)^2$" in the first line should be removed since R is not defined in this section.

This entry last updated 23 May 2004.

11 **Properties**, **Section 5.1.10.2**, page 393. The third expression in the box for item number 4 now has

A^{-1}	$-A\frac{dA}{dt}A^{-1}$

This is incorrect, it should have been

A^{-1}	$-A^{\boxed{-1}}\frac{dA}{dt}A^{-1}$

This entry last updated 10 June 2005.

12 **MOMENTS OF INERTIA FOR VARIOUS BODIES**, **Section 5.3.12**, page 410. The definition of the moment of inertia is missing. The following line should be added:

> The moment of intertia is $\int_V \rho(r) r_\perp^2 \, dV$ where $r_\perp$ is the perpendicular distance from the axis of rotation.

(Thanks to Francis Loranger for correcting this error.)

This entry last updated 10 June 2005.

13 **Integral 631**, **Section 5.5**, page 451. The evaluation of the integral is given as

$$\frac{1}{2}B\left(\frac{n}{2}\right)\frac{m}{2}$$

which is incorrect, it should have been

$$\frac{1}{2}B\left(\frac{n}{2},\frac{m}{2}\right)$$

(Thanks to Roger Nelsen for correcting this error.)

This entry last updated 23 May 2004.

FOOTNOTE: An alert reader will wonder how this error could have occurred, since the integrals in the last edition of this book have been electronically verified. The error occurred in the typesetting of this integral—not in the electronic verification of the integrals.

14 **Integral 635**, **Section 5.5**, page 451. The constraint on the integral is presently

> m is a non-negative integer

which is correct; but could be expanded to

> m is real

(Thanks to Roger Nelsen for correcting this error.)

This entry last updated 23 May 2004.

15 **RESULTS**, **5.10.5**, page 487. The last note on the page (number 1) is missing some text. It should have said:

1. A unique connection ∇ called the *Levi–Civita* or *pseudo-Riemannian connection* with vanishing torsion (${S^i}_{jk} = 0$) exists that satisfies $\nabla_i g_{jk} = 0$. It follows that $\nabla_i g^{jk} = 0$. The connection coefficients of ∇, called the *Christoffel symbols of the second kind*, are given by ${\Gamma^i}_{jk} = g^{i\ell}[jk,\ell]$, where $[jk,\ell] = \frac{1}{2}(g_{j\ell,k} + g_{k\ell,j} - g_{jk,\ell})$ are the *Christoffel symbols of the first kind*. Note that ${\Gamma^k}_{jk} = \frac{1}{2}\partial_j(\log g) = |g|^{-\frac{1}{2}}\partial_j|g|^{\frac{1}{2}}$ and $g_{ij,k} = [ki,j] + [kj,i]$.

(Thanks to Francis Loranger for correcting this error.)

This entry last updated 10 June 2005.

16 **Section 6.3.2**, page 518. The displayed equation now has

$$\begin{aligned} t &= \arcsin z = (-1)^k t_0 + k\pi, && \text{with } \sin t_0 = z, \\ t &= \arccos z = \pm t_1 + 2k\pi, && \text{with } \boxed{\sin} t_1 = z, \\ t &= \arctan z = t_2 + k\pi, && \text{with } \boxed{\sin} t_2 = z, \end{aligned}$$

which is incorrect; it should be

$$\begin{aligned} t &= \arcsin z = (-1)^k t_0 + k\pi, && \text{with } \sin t_0 = z, \\ t &= \arccos z = \pm t_1 + 2k\pi, && \text{with } \boxed{\cos} t_1 = z, \\ t &= \arctan z = t_2 + k\pi, && \text{with } \boxed{\tan} t_2 = z, \end{aligned}$$

(Thanks to Timothy Leung for correcting this error.)

This entry last updated 23 May 2004.

17 **INTEGRALS**, **Section 6.19.7**, page 561. This section would be better named **INTEGRAL REPRESENTATIONS**.

This entry last updated 23 May 2004.

18 **Formula 6.21.2 3**, **Section 6.21.2**, page 573. The formula is presently

$$\frac{d}{du}\operatorname{dn} u = -k^2 \operatorname{cn} u \operatorname{dn} u.$$

This is incorrect; it should have been

$$\frac{d}{du}\operatorname{dn} u = -k^2 \operatorname{cn} u \operatorname{sn} u.$$

(Thanks to Jesse Pratt for correcting this error.)

This entry last updated 23 May 2004.

19 **LAPLACE TRANSFORMS**, **Section 6.33**, page 607. Entries number 29 and 30 are presently:

No.	$f(t)$	$F(s)$
29	$-\frac{e^{\boxed{-}at}}{4^{n-1}b^{2n}} \sum_{k=1}^{n} \binom{2n-k-1}{n-1} \times \boxed{(-2t)^{k-1}} \frac{d^k}{dt^k}[\cos bt]$	$\frac{1}{[(s-a)^2+b^2]^n}$
30	$\frac{e^{\boxed{-}at}}{4^{n-1}b^{2n}} \left\{ \sum_{k=1}^{n} \binom{2n-k-1}{n-1} \frac{(-2t)^{k-1}}{(k-1)!} \times \frac{d^k}{dt^k}\left[a\cos bt + b\sin \boxed{a}t\right] - 2b \sum_{k=1}^{n-1} \binom{2n-k-2}{n-1} \frac{(-2t)^{k-1}}{(k-1)!} \times \frac{d^k}{dt^k}[\sin bt] \right\}$	$\frac{s}{[(s-a)^2+b^2]^n}$

These are incorrect, they should have been:

No.	$f(t)$	$F(s)$
29	$-\frac{e^{at}}{4^{n-1}b^{2n}} \sum_{k=1}^{n} \binom{2n-k-1}{n-1} \times \boxed{\frac{(-2t)^{k-1}}{(k-1)!}} \frac{d^k}{dt^k}[\cos bt]$	$\frac{1}{[(s-a)^2+b^2]^n}$
30	$\frac{e^{at}}{4^{n-1}b^{2n}} \left\{ \sum_{k=1}^{n} \binom{2n-k-1}{n-1} \frac{(-2t)^{k-1}}{(k-1)!} \times \frac{d^k}{dt^k}\left[\boxed{-}a\cos bt + b\sin \boxed{b}t\right] - 2b \sum_{k=1}^{n-1} \binom{2n-k-2}{n-1} \frac{(-2t)^{k-1}}{(k-1)!} \times \frac{d^k}{dt^k}[\sin bt] \right\}$	$\frac{s}{[(s-a)^2+b^2]^n}$

(Thanks to Ningning Song for correcting this error.)

This entry last updated 23 May 2004.

20 **GAMBLER's RUIN PROBLEM**, **7.2.2**, page 627. Line 3 now has

> ... has either $\boxed{\text{last}}$ z dollars ...

This is incorrect, it should have been

> ... has either $\boxed{\text{lost}}$ z dollars ...

(Thanks to Francis Loranger and Ronald R Kusner for correcting this error.)

This entry last updated 10 June 2005.

21 **BIRTHDAY PROBLEM**, **7.2.5**, page 629. Second text line from the bottom 3 now has

> ... (so that $k = 1$ is the ...

This is incorrect, it should have been

> ... (so that $k = 1$ $\boxed{\text{and } p = 2}$ is the ...

(Thanks to Francis Loranger for correcting this error.)

This entry last updated 10 June 2005.

22 **Formula 7.14.1**, **Section 7.14.1**, page 695. The integral presently has an upper limit of "∞"; this is incorrect. The upper limit should be "z".

(Thanks to Joseph J. Rushanan for correcting this error.)

This entry last updated 23 May 2004.

Dates of updates and errata numbers modified at those dates

2004/5/23
2, 8–10, 13, 14, 16–19, 22

2005/6/10
1, 3–7, 11, 12, 15, 20, 21