# Errata for
# *Tables of Integrals, Series, and Products (7th edition)*

by I. S. Gradshteyn and M. Ryzhik
edited by Alan Jeffrey and Daniel Zwillinger,
Academic Press, Orlando, Florida, 2007
ISBN 0-12-373637-4
http://www.mathtable.com/gr

4/11/2008 UPDATED: April 11, 2008

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 The date that an update to these errata pages is made is shown in the margin.
3 Sometimes many contributors bring the same errata to our attention.
4 The latest errata is available from http://www.mathtable.com/zwillinger/errata/.

ERRATA

1 **Acknowledgements**, pages xxiii–xxv, The following names should be added

4/11/2008

- Dr. Ir. Luk R. Arnaut
- Dr. Peter Arnold
- Dr. Henry Corback
- Ir. Enno Diekema
- Dr. Grant Erdmann
- Dr. Joel T. Johnson
- Dr. Javier Navarro Laboulais
- Dr. Yefim Leifman
- Dr. Angelo Melino
- Dr. Haixing Miao
- Dr. Ali Rushdi
- Dr. Sherwood Samn
- Dr. Detmar Welz

2 **Summation 0.245.3**, page 13, presently has the value

4/11/2008

$$\frac{1}{e} = 0.36787\ldots$$

which is incorrect. It should have been

$$\frac{1}{2e} = 0.1839397\ldots$$

(Thanks to an anonymous reviewer for correcting this error.)

3 **Formula 0.434**, page 23. The formula needs the following constraint:

4/11/2008

$$n < p$$

(Thanks to Angelo Melino for correcting this error.)

4/11/2008

4 **Integral 2.33 4**, page 108, presently has an evaluation that begins

$$\pm\frac{x^{m+1-n}}{na}$$

which is incorrect. It should have been

$$\pm\frac{x^{m+1-n}}{na}e^{\pm ax^n}$$

(Thanks to Henry Corback for correcting this error.)

4/11/2008

5 **Integral 2.33.16**, page 109, presently has the integrand

$$e^{-\beta x^n}$$

which is incorrect. It should have been

$$e^{-\beta x^2}$$

(Thanks to Victor H. Moll for correcting this error.)

4/11/2008

6 **Integral 2.536 1**, page 164, presently has an evaluation that begins

$$\frac{1}{p+1}\cdots$$

which is incorrect. It should have been

$$\frac{1}{p+a}\cdots$$

(Thanks to Sherwood Samn and Grant Erdmann for correcting this error.)

4/11/2008

7 **Integral 3.112 5**, page 253, presently has an evaluation that is missing a minus sign ("$-$") in front of the entire expression.

(Thanks to Haixing Miao for correcting this error.)

4/11/2008

8 **Integrals in 3.323**, page 337. The following new integral should be added (which is a generalization of 3.323.3):

**3.323.4** $$\int_0^\infty \exp\left(-\beta^2x^4 \pm 2\gamma^2x^2\right)\,dx = \frac{\pi}{4}\frac{\gamma}{\beta}\exp\left(\frac{\gamma^4}{2\beta^2}\right)\left[I_{-1/4}\left(\frac{\gamma^4}{2\beta^2}\right) \pm I_{1/4}\left(\frac{\gamma^4}{2\beta^2}\right)\right]$$

(Thanks to Joel T. Johnson for suggesting this addition.)

4/11/2008

9 **Integral 3.457 2**, page 364, the evaluation is presently

$$\frac{2}{(2n+1)a^{n+1/2}}\left[\ln(4a) - \boxed{3}\,\boldsymbol{C} - 2\psi(2n)\boxed{-}\psi(n)\right]$$

which is incorrect, it should have been

$$\frac{2}{(2n+1)a^{n+1/2}}\left[\ln(4a) - \boldsymbol{C} - 2\psi(2n) + \psi(n)\right]$$

(Thanks to Victor H. Moll for correcting this error.)

4/11/2008

10 **Integral 3.471.1**, page 367, is missing the constraint "$\beta > 0$".

(Thanks to Victor H. Moll for correcting this error.)

4/11/2008

11 **Integral 3.624 3**, page 396, has an extra factorial in the result. The result is presently

$$\pi \frac{(2n)!!}{2^{2n+1}(n!)^2}$$

which is incorrect; it should have been

$$\pi \frac{(2n)!}{2^{2n+1}(n!)^2}$$

(Thanks to Victor H. Moll for correcting this error.)

4/11/2008

12 **Integral 3.652 3**, page 403, in two places the angle $x$ is in an incorrect position. That is "$\cot^{\mu+\frac{1}{2}x}$" should be "$\cot^{\mu+\frac{1}{2}}\, x$" and "$\tan^{\mu-\frac{1}{2}x}$" should be "$\tan^{\mu-\frac{1}{2}}\, x$".

(Thanks to Victor H. Moll for correcting this error.)

4/11/2008

13 **Integral 3.654 3**, page 404, has the angle $x$ is an incorrect position. That is "$\tan^{\pm(\mu-1)x}$" should be "$\tan^{\pm(\mu-1)}\, x$".

(Thanks to Victor H. Moll for correcting this error.)

4/11/2008

14 **Integral 3.691 3**, page 415, the integrand now ends with an "$x$" when is should end with a "$dx$".

(Thanks to Victor H. Moll for correcting this error.)

4/11/2008

15 **Integral 3.725.2**, page 425, the integral should be a principal value integral.

(Thanks to Victor H. Moll for correcting this error.)

4/11/2008

16 **Integral 3.852 5**, page 476, the integrand is presently

$$\left(\sin^2 x - x^2 \cos x^2\right) \frac{1}{x^4}$$

which is incorrect; it should have been

$$\left(\sin x^2 - x^2 \cos x^2\right) \frac{1}{x^4}$$

(Thanks to Victor H. Moll for correcting this error.)

4/11/2008

17 **Integral 3.852 6**, page 476, the integrand is presently

$$\left(\cos^2 x - \frac{1}{1+x^2}\right) \frac{1}{x}$$

which is incorrect; it should have been

$$\left(\cos x^2 - \frac{1}{1+x^2}\right) \frac{1}{x}$$

(Thanks to Victor H. Moll for correcting this error.)

4/11/2008

18 **Integrals 3.462 20–3.462 24**, pages 476–477, the integrands all presently have the term

$$\sqrt{x+b^2}$$

and, in every case, it should be

$$\sqrt{x^2+b^2}$$

(Thanks to Victor H. Moll for correcting this error.)

4/11/2008 19 **Integral 3.931 4**, page 495, the first integrand presently has the limits

$$\int_0^{\pi/2}$$

which is incorrect; it should have been

$$\int_0^{\pi}$$

(Thanks to Victor H. Moll for correcting this error.)

4/11/2008 20 **Integrals 3.948.5 and 3.948.6**, page 500, each integrand contains "$e^{-\beta x}$" which is incorrect; they should have been "$e^{-px}$".

(Thanks to Victor H. Moll for correcting this error.)

4/11/2008 21 **Integral 3.982.3**, page 510, the denominator of the integrand is now "$\sinh^2 \boxed{h}x$" which is incorrect; it should have been "$\sinh^2 x$'.

(Thanks to Victor H. Moll for correcting this error.)

4/11/2008 22 **Integral 3.987.1**, page 512, the result contains an "$\alpha$" which should be an "$a$".

(Thanks to Victor H. Moll for correcting this error.)

4/11/2008 23 **Integral 4.134.1**, page 524. This integral is incorrect and should be deleted. (Note that the integrand and limits are identical to integral 4.134.2)

(Thanks to Victor H. Moll for identifying this error.)

4/11/2008 24 **Integrals 4.135.1–2**, page 524. Each of these integrals contains the term

$$\cdots \left( \boxed{-} \frac{\beta\gamma^2}{\alpha^2+\beta^2} \right) \cdots$$

which is incorrect. This term should have been

$$\cdots \left( \frac{\beta\gamma^2}{\alpha^2+\beta^2} \right) \cdots$$

(Thanks to Joel T. Johnson for correcting these errors.)

4/11/2008 25 **Integral 4.272.8**, page 552. The evaluation of this integral is incorrect. The correct evaluation is:

$$(n-1)! \sum_{k=0}^{\infty} \frac{(-1)^k}{(\nu+k)^n}$$

(Thanks to Victor H. Moll for correcting this error.)

4/11/2008 26 **Integral 4.272.18**, page 552. The evaluation of this integral is incorrect. The correct evaluation is:

$$\Gamma\left(3-\frac{1}{n}\right)\left(p^{-3+\frac{1}{n}}-q^{-3+\frac{1}{n}}\right)$$

(Thanks to Victor H. Moll for correcting this error.)

4/11/2008

27 **Integral 4.397.8**, page 589, the integrand is presently

$$\ln\left(1-2a\cos x+a^2\right)\sin nx\sin x$$

which is incorrect, it should have been

$$\ln\left(1-2a\cos x+a^2\right)\cos nx\cos x$$

(Thanks to Victor H. Moll for correcting this error.)

4/11/2008

28 **Integral 4.428.1**, page 595. The evaluation of this integral is incorrect. The correct evaluation is:

$$=\pi\left(a+b\log 2+\sum_{n=1}^{m}\frac{(-1)^n(b-2an)}{n}\right)$$

where $m\le\frac{b}{2a}<m+1$ and $m=0,1,2,3,\ldots$

(Thanks to Yefim Leifman for correcting this error.)

4/11/2008

29 **Integral 4.537.3**, page 604, the integrand is presently

$$\arctan\left(\tan\lambda\sqrt{1-k^2x^2}\right)$$

which is incorrect, it should have been

$$\arctan\left(\tan\lambda\sqrt{1-k^2x^2}\right)$$

(Thanks to Victor H. Moll for correcting this error.)

4/11/2008

30 **Integrals in 5.112**, page 620. The following new integral should be added:

**5.112.14** $$\int\frac{\mathbf{K}(k)}{k^4}dk=-\frac{1}{9k^3}\left[\left(1+4k^2\right)\mathbf{E}(k)+2k'^2\,\mathbf{K}(k)\right]$$

(Thanks to Detmar Welz for suggesting this addition.)

4/11/2008

31 **Integral 5.52.2**, page 629, presently has

$$\int x^{-p}\,Z_{p+1}(x)\,dx=-x^{-p}\,Z_p(x)$$

which is incorrect. It should have been

$$\int x^{-p+1}\,Z_p(x)\,dx=-x^{-p+1}\,Z_{p-1}(x)$$

(Thanks to Detmar Welz for correcting this error.)

4/11/2008

32 **Integral 6.153**, page 633, is incorrect; it should be replaced with

$$\int_0^1\frac{x\,\mathbf{E}(ax)}{(1-a^2x^2)\sqrt{1-x^2}}dx=\frac{\pi}{2\sqrt{1-a^2}}$$

valid when $a^2<1$.

(Thanks to Detmar Welz for correcting this error.)

4/11/2008

33 **Integral 6.155–6.157**, page 633. The following new integrals should be added:

**6.155** $$\int_0^1 \frac{x\,\mathbf{K}(ax)}{\sqrt{1-x^2}}dx = \frac{\pi}{2a}\arcsin(a) \qquad [a^2 \le 1]$$

**6.156** $$\int_0^1 \frac{x\,\mathbf{E}(ax)}{\sqrt{1-x^2}}dx = \frac{\pi}{4a}\left(\arcsin(a) + a\sqrt{1-a^2}\right) \qquad [a^2 \le 1]$$

**6.157** $$\int_0^1 \left[\left(1-\frac{k^2}{2}\right)\mathbf{K}(k) - \mathbf{E}(k)\right]^2 \left(1-\frac{k^2}{2}\right)\frac{dk}{k^7} = \frac{1}{48}$$

(Thanks to Detmar Welz for suggesting these additions.)

4/11/2008

34 **Integral 6.592.1**, page 690, the integration range is presently $\int_0^\infty$ which is incorrect. It should have been $\int_0^1$

4/11/2008

35 **Integral 6.625.10**, page 704, the integrand is presently

$$\boxed{x^{-\mu-\frac{1}{2}(x-1)\mu-1}}e^{-\alpha x}\,K_\nu(\alpha x)$$

which is incorrect. It should have been

$$\boxed{x^{-\mu-\frac{1}{2}}(x-1)^{\mu-1}}e^{-\alpha x}\,K_\nu(\alpha x)$$

(Thanks to Theodoros Theodoulidis for this correction.)

4/11/2008

36 **Formula 8.241.1**, page 887, presently has the term

$$\cdots = \boxed{x\ln\ln\tfrac{1}{x}} - \ldots$$

which is incorrect and should be removed.

(Thanks to Frank O'Brien for this correction.)

4/11/2008

37 **Summations 8.514.8–9**, page 935. The following new summations should be added:

**8.514.8** $$\sum_{k=1}^{\infty}\frac{(-1)^k}{2k}J_{2k}(z) = -\frac{\pi}{8}N_0(z) + \frac{1}{4}\left(\log\frac{z}{2} + \boldsymbol{C}\right)J_0(z)$$

**8.514.9** $$\sum_{k=1}^{\infty}\frac{(-1)^k(2k+1)}{(2k+1)^2-1}J_{2k+1}(z) = -\frac{\pi}{8}N_1(z) + \frac{1}{4}\left(\log\frac{z}{2} + \boldsymbol{C} - 1\right)J_1(z) - \frac{1}{4z}J_0(z)$$

(Thanks to Detmar Welz for suggesting these additions.)

4/11/2008

38 **Formula 8.936.1** page 992, presently contains the term

$$\ldots\left\{\frac{1}{4}\left(\boxed{t^2-1}\right)\right\}^{\frac{1}{4}-\frac{\lambda}{2}}\ldots$$

which is incorrect. It should have been

$$\ldots\left\{\frac{1}{4}\left(\boxed{1-t^2}\right)\right\}^{\frac{1}{4}-\frac{\lambda}{2}}\ldots$$

(Thanks to Enno Diekema for this correction.)

4/11/2008

39 **Formula 8.982.2**, page 1004 presently has an "$x$" on the left hand side of the equation, which is incorrect; it should be a "$z$".

(Thanks to Luk Arnaut for this correction.)

4/11/2008

40 **Formula 9.303**, page 1033 is presently incorrect. The first product sign in the numerator should have a prime on it, similar to the prime in 9.304.

(Thanks to Peter Arnold for this correction.)

4/11/2008

41 **Formula 13.215.6.(ii)**, page 1073. The formula is presently

$$a_{ii}\boxed{a_{ij}} > |a_i j|^2 \qquad \text{for } i \neq j$$

which is incorrect. It should have been

$$a_{ii}\boxed{a_{jj}} > |a_i j|^2 \qquad \text{for } i \neq j$$

(Thanks to Ali Rushdi for this correction.)

4/11/2008

42 **Statement 14.12.1**, page 1075. The statement now begins

> If any two $\boxed{\text{adjacent}}$ rows (or columns) . . .

While this is correct, it would be better to say

> If any two rows (or columns) . . .

(Thanks to Ali Rushdi for this correction.)

## Dates of updates and errata numbers modified at those dates

**4/11/2008** 1–42