Errata, 1994–1997

"And if you happen in reading to finde any more faultes not here mentioned, as peraduenture you may, ... I trust you will therefore impute no blame either vnto me or to the Printer, but gently amend and correct them, accepting our good minde, which was to haue had the booke passed to your handes vtterly without fault, as touching the Printing."
—from the first English edition of Euclid [98]

THIS IS A LIST of all corrections made to the second edition of *Concrete Mathematics* by Graham, Knuth, and Patashnik, after the first appearance of that book in February 1994 until the final updates to the hardcover version made at the beginning of 1998. All subsequent updates are posted on Internet page `http://www-cs-faculty.stanford.edu/~knuth/gkp.html`, where you can also find additional material such as exam questions and answers that were prepared after the book was published.

Minor changes in typographic layout are not listed here; neither are changes to the index that were precipitated by changes to the text. With these modifications, the book should be perfect.

But you may disagree. To claim a reward for any anomalies you spot that aren't shown here, please send your comments to D. E. Knuth, Computer Science Department, Stanford University, Stanford CA 94305-9045, or by email to `knuth-bug@cs.stanford.edu`, as soon as possible. Please use email only to report errors, not to ask questions.

All of the items dated before February 1995, and a few items dated after that, were corrected in the second printing.

Page 20, line 16 (10 Jan 95)

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whose solution is periodic regardless of the initial values $X_0, \ldots, X_{k-1}$.

Page 76, line 8 from the bottom (18 Dec 96)

1,000,000,000	1500000.0	1502497	0.166

Page 87, lines 11 to 14 from the bottom (13 May 95)

for all irrational α and all bounded functions f that are continuous almost everywhere. For example, the *average* value of $\{n\alpha\}$ can be found by setting $f(x) = x$; we get $\frac{1}{2}$. (That's exactly what we might expect; but it's nice to know that it is really, provably true, no matter how irrational α is.)

Page 88, last two lines and top line of page 89 (31 Jan 95)

The quantity $j\alpha'$ will be an integer only when $j = 0$, since α (hence α') is irrational; and $j\alpha' - \nu'$ will be an integer for at most one value of j. So we can change the ceiling terms to floors:

Page 89, line 14 (31 Jan 95)

Here ϵ is a positive error less than $\nu\alpha^{-1}$. Exercise 18 proves that S is, simi-

Page 89, line 18 [the first printing was correct] (26 Sep 95)

$$D(\alpha, n) \leqslant D(\alpha', \lfloor \alpha n \rfloor) + \alpha^{-1} + 2\,. \tag{3.31}$$

Page 89, lines 11 and 12 from the bottom (26 Sep 95)

sufficiently large. Hence theorem (3.28) is true; however, convergence to the limit is not always very fast. (See exercises 9.45 and 9.61.)

Page 97, line 7 from the bottom [first printing was correct] (26 Sep 95)

$$D(\alpha, n) \geqslant D\bigl(\alpha', \lfloor \alpha n \rfloor\bigr) - \alpha^{-1} - 2\,.$$

Page 109, line 23 (13 Jan 95)

out, its 65,050 decimal digits require 78 cents U.S. postage to mail first class.

Page 109, line 7 from the bottom (31 Dec 97)

seventeenth century [269]. The Mersenne primes known prior to 1998 occur

Page 109, line 4 from the bottom (31 Dec 97)

110503, 132049, 216091, 756839, 859433, 1257787, 1398269, and 2976221.

Page 110, lines 8 and following (4 Jan 94)

been a Mersenne prime, although only a few dozen Mersenne primes are known. Many people are trying ...

Page 116, line 19 (31 Dec 95)

independently by Moritz Stern [339], a German mathematician, and Achille

Page 122, new graffito for middle of page (15 Apr 96)

Hermann Minkowski illustrated this remarkable binary representation at the International Congress of Mathematicians in Heidelberg, 1904.

Page 123, lines 2–4 (26 Sep 95)

example, $\frac{878}{323} \approx 2.718266 \approx .999994e$; we obtained this fraction from the first 16 letters of e's Stern–Brocot representation, and the accuracy is about what we would get with 16 bits of e's binary representation.

Page 126, line 21 (28 Mar 97)

discovered by Sun Tzŭ in China, about A.D. 350.

Page 130, line 4 from the bottom in second printing (1 Mar 95)

ception of one that became the most famous of all, because it baffled the

Page 131, lines 1–4 (1 Mar 95)

for all positive integers a, b, c, and n, when $n > 2$. (Of course there are lots of solutions to the equations $a + b = c$ and $a^2 + b^2 = c^2$.) Andrew Wiles has apparently settled the question at long last; his intricate, epoch-making proof of (4.46) appears in *Annals of Mathematics* **141** (1995), 443–551.

Page 146, lines 2–4 from the bottom (24 May 96)

$m_1, \ldots, m_r$ be positive integers with $m_j \perp m_k$ for $1 \leqslant j < k \leqslant r$; let $m = m_1 \ldots m_r$; and let $a_1, \ldots, a_r$, A be integers. Then there is exactly one integer a such that

Page 149, lines 1 and 2 (25 Apr 95)

49 Let $R(N)$ be the number of pairs of integers (m, n) such that $1 \leqslant m \leqslant N$, $1 \leqslant n \leqslant N$, and $m \perp n$.

Page 149, line 7 from the bottom (24 May 96)

53 Find all positive integers n such that $n \backslash \lceil (n-1)!/(n+1) \rceil$.

Page 171, line 7 from the bottom (9 April 96)

This follows from a five-parameter identity discovered by John Dougall [82] early in the twentieth century.

Page 172, line 9 (13 May 95)

several people shortly thereafter. Exercise 86 gives a "simple" proof of (5.31).

Page 177, line 6 from the bottom (24 May 96)

seen so far. And we're faced with a sum of $2^{1000000} + 1$ terms, so we can't just

Page 200, line 4 from the bottom (1 Dec 94)

We will prove in Section 7.5 that these functions satisfy the identities

Page 201, addendum to the graffito (12 May 95)

Exercise 84 explains how to derive (5.61) from (5.60).

Page 202, line 8 from the bottom (20 Jun 96)

$$\mathcal{E}(z) \;=\; \sum_{k\geqslant 0}(k+1)^{k-1}\frac{z^k}{k!} \;=\; 1+z+\frac{3}{2}z^2+\frac{8}{3}z^3+\frac{125}{24}z^4+\cdots\,, \qquad (5.66)$$

Page 206, new graffito about 10 lines from the bottom (6 Jun 96)

We didn't discuss convergence of (5.56), (5.57), (5.58), … either.

Page 211, addendum to the graffito in middle of page (7 Nov 94)

The value is infinite when z is a negative integer and w is not an integer.

Page 215, line 4 (13 May 95)

$$F\left({n+1,\; m-n,\; 1,\; \frac12 \atop \frac12 m+1,\; \frac12 m+\frac12,\; 2}\,\middle|\, 1\right) \;=\; \frac{m}{n}\,, \qquad \text{integer } n \geqslant m > 0,$$

Page 215, line 6 (13 May 95)

new. But it really isn't; the left-hand side can be replaced by a multiple of

Page 215, line 11 from the bottom (13 May 95)

$$F\left({\frac13 r,\; \frac13 r+\frac13,\; \frac13 r+\frac23,\; -n,\; -n-\frac12 s,\; -n-\frac12 s+\frac12 \atop \frac12 r+\frac12,\; \frac12 r+1,\; -n-\frac13 s,\; -n-\frac13 s+\frac13,\; -n-\frac13 s+\frac23}\,\middle|\, 1\right)$$

Page 215, line 8 from the bottom (13 May 95)

quantities (r, s, n) are replaced respectively by $(1, m-2n-1, n-m)$.

Page 222, line 10 (12 Aug 96)

whenever both infinite sums converge. And in fact both sums always do converge, except in the degenerate case when $a+b+\frac{1}{2}$ is a nonpositive integer.

Page 232, line 2 in first printing (11 Apr 95)

$\deg(R) = 1$ (assuming that $z \neq \pm 1$), we have $d = \deg(\hat{p}) - \deg(Q) = 0$ and

Page 233, line 11 (1 Jun 94)

algorithm can be formulated as follows, when $t(n, k)$ is given:

Page 237, line 2 from the bottom (26 Sep 95)

And $\binom{1}{n+1} z^{n+1} = \binom{0}{n} z^{n+1} = T(n, n+1)$ for all $n \geqslant 0$, so we obtain

Page 241, line 4 from the bottom (13 Jan 95)

Exercises 98–108 provide additional examples of the Gosper-Zeilberger

Page 244, lines 2 and 3 (24 May 96)

definition, by showing that the limit in (5.83) is $1/m!$ when $z = m$ is a positive integer.

Page 245, line 14 (24 May 96)

when c is a nonnegative integer. (See (5.115).) Use this idea to evaluate

Page 253, line 3 from the bottom (26 Sep 95)

94 Find $\sum \binom{a}{k}\binom{-a}{n-k}\,\delta k$ when n is a positive integer.

Page 254, line 2 of exercise 99 (26 Sep 95)

when $t(n,k) = (n+a+b+c+k)!/(n+k)!\,(c+k)!\,(b-k)!\,(a-k)!\,k!$,

Page 272, equations (6.50), (6.51), (6.53) (4 Jun 95)

change $\sum\limits_{n\geqslant 0}$ to $\sum\limits_{n}$

Page 289, lines 6 and 7 (4 Jun 95)

$$S_6(n) \;=\; n(n-\tfrac{1}{2})(n-1)(n-\tfrac{1}{2}+\alpha)(n-\tfrac{1}{2}-\alpha)(n-\tfrac{1}{2}+\overline{\alpha})(n-\tfrac{1}{2}-\overline{\alpha})/7\,,$$
$$\text{where } \alpha = 2^{-3/2}\,3^{-1/4}\Bigl(\sqrt{\sqrt{31}+\sqrt{27}}+i\sqrt{\sqrt{31}-\sqrt{27}}\,\Bigr).$$

Page 289, line 10 from the bottom (4 Jun 95)

$$\sum_{j\geqslant 0}\left\{ {m \atop j} \right\}\left[{j+1 \atop k} \right]\frac{(-1)^{j+1-k}}{j+1} \;=\; \frac{1}{m+1}\binom{m+1}{k}B_{m+1-k}\,, \quad k > 0. \qquad (6.99)$$

Page 290, line 8 (4 Jun 95)

$$\sum_{k}\left\{ {n \atop k} \right\}\left[{k \atop m} \right]\frac{(-1)^{k-m}}{k} \;=\; \frac{1}{n}\binom{n}{m}B_{n-m} + [m = n-1]\,, \quad m > 0. \qquad (6.100)$$

Page 292, line 13 from the bottom (27 Oct 97)

the Italian astronomer Gian Domenico Cassini in 1680 [51], is the identity

Page 292, lines 10 and 11 from the bottom (27 May 94)

When $n = 6$, for example, Cassini's identity correctly claims that $13\cdot 5 - 8^2$ equals 1. (Johannes Kepler knew this law already in 1608 [202].)

Page 301, lines 19–24 (9 Jul 95)

of miles per n kilometers for all $n \leqslant 100$, except in the cases $n = 4$, 12, 54, 62, 75, 83, 91, 96, and 99, when it is off by less than 2/3 mile. And the shift-up rule gives either the correctly rounded number of kilometers for n miles, or 1 km too many, for all $n \leqslant 113$. (The only really embarrassing case is $n = 4$, where the individual rounding errors for $n = 3+1$ both go the same direction instead of cancelling each other out.)

Page 316, line 4 from the bottom (9 Jul 95)

$$\prod_{k\geqslant 1}\Bigl(1+\frac{z}{k}\Bigr)e^{-z/k} \;=\; \frac{e^{-\gamma z}}{z!}\,,$$

Page 317, line 4 (4 Jun 95)

$$\frac{z}{2^n}\cot\frac{z}{2^n} - \frac{z}{2^n}\tan\frac{z}{2^n} + \sum_{k=1}^{2^{n-1}-1}\frac{z}{2^n}\left(\cot\frac{z+k\pi}{2^n} + \cot\frac{z-k\pi}{2^n}\right),$$

Page 317, lines 6–9 from the bottom (21 Jun 94)

77 When m and n are integers, $n \geqslant 0$, the value of $\sigma_n(m)$ is given by (6.48) if $m < 0$, by (6.49) if $m > n$, and by (6.101) if $m = 0$. Show that in the remaining cases we have

$$\sigma_n(m) \;=\; \frac{(-1)^{m+n-1}}{m!\,(n-m)!}\sum_{k=0}^{m-1}\left[{m \atop m-k}\right]\frac{B_{n-k}}{n-k}\,, \quad \text{integer } n \geqslant m > 0.$$

Page 319, line 14 from the bottom (1 Nov 94)

a Are there infinitely many n with $p \backslash a_n$, for some fixed prime p?

Page 353, line 6 (4 Jun 95)

$$\frac{e^w - e^z}{we^z - ze^w} \;=\; \sum_{m,n\geqslant 0}\left\langle {m+n+1 \atop m} \right\rangle \frac{w^m z^n}{(m+n+1)!}\,. \qquad (7.60)$$

Page 361, line 20 and following	(13 May 95)

sequences $\langle a_0, \ldots, a_{mn} \rangle$ arise uniquely in this way, if $n > 0$: The last term a_{mn} must be $(1-m)$. The partial sums ...

Page 379, line 2 from the bottom	(17 May 94)

have the form $p_n(y) = \sum_{m=0}^{n} \left|{n \atop m}\right| y^m$, where $\left|{n \atop m}\right|$ is a positive integer for

Page 391, line 5	(12 May 95)

between 6.975 million and 7.025 million.

Page 393, line 1	(12 May 95)

We estimate the average spot sum of these dice to be $7.4 \pm 2.1/\sqrt{10} \approx 7.4 \pm 0.7$,

Page 419, line 4	(4 Jun 95)

Once again we have gained the desired speedup factor of $1/m$. If $m \approx n/\ln n$

Page 419, lines 8 and 9	(4 Jun 95)

this distribution is called "Zipf's law." Then $\mathrm{Mean}(S) = n/H_n - 1$, $\mathrm{Var}(S) = \frac{1}{2}n(n+1)/H_n - n^2/H_n^2$. The average number of probes for $m \approx n/\ln n$ as

Page 425, line 18	(24 May 96)

must set a `NEXT` entry to $n+1$. These two cases may take different amounts

Page 426, bottom three lines	(4 Jun 95)

$m = n/\ln n + O(1)$ and $n \to \infty$ the corresponding results are

$$\begin{aligned} \mathrm{Mean}(G_T) &= \beta \ln n + \alpha + O\big((\log n)^2/n\big)\,; \\ \mathrm{Var}(G_T) &= \beta^2 \ln n + O\big((\log n)^2/n\big)\,. \end{aligned}$$

Page 433, second graffito should be in French (8 May 96)

"Une rapide opération arithmétique montre que, grâce à cette ingénieuse cascade, les xérès ont toujours au moins trois ans. Pousser plus loin le calcul de leur âge donne le vertige."
—Revue du vin de France (Nov 1984)

Page 457, line 4 from the bottom (9 Jul 95)

For example, when $n = 10^6$ this estimate comes to $15631363.6 + O(n/\log n)$;

Page 466, line 5 (26 Sep 95)

$$O\biggl(\sum_{0<k<n}\frac{(\log n)^2}{k(n-k)}\biggr) \;=\; O\biggl(\frac{(\log n)^3}{n}\biggr),$$

Page 474, line 3 (9 Jul 95)

negative multiple of $\cos(2\pi x - \frac{1}{2}\pi m)$, with error $O\bigl(2^{-m}\max_x B_m(\{x\})\bigr)$.

Page 475, line 11 (9 Jul 95)

$$R_{2m} \;=\; \theta_m \frac{B_{2m+2}}{(2m+2)!} f^{(2m+1)}(x)\Big|_a^b, \qquad \text{for some } 0 \leqslant \theta_m \leqslant 1; \tag{9.80}$$

Page 477, line 14 from the bottom (9 Jul 95)

So $R_4(n)$ is actually equal to $\frac{89}{128} - \ln 2 + O(n^{-5})$, but Euler's summation

Page 480, line 4 from the bottom (9 Jul 95)

$$H_n \;=\; \ln n + \gamma + \frac{1}{2n} - \sum_{k=1}^{m}\frac{B_{2k}}{2kn^{2k}} - \theta_{m,n}\frac{B_{2m+2}}{(2m+2)n^{2m+2}}, \tag{9.88}$$

Page 481, line 5 (27 May 94)

the value of γ correct to 1271 decimal places, beginning thus:

Page 500, lines 15–18 (31 Jan 95)

1.19 Not when $n > 5$. A bent line whose half-lines run at angles θ and $\theta + 30^\circ$ from its apex can intersect four times with another whose half-lines run at angles ϕ and $\phi + 30^\circ$ only if $30^\circ < |\theta - \phi| < 150^\circ$. We can't choose more than 5 angles this far apart from each other. (It is possible to choose 5.)

Page 501, lines 5 and following (20 Feb 95)

1.24 The only known examples are: $X_n = 2i \sin \pi r + 1/X_{n-1}$, where r is rational and $0 \leqslant r < \frac{1}{2}$ (all period lengths $\geqslant 2$ occur as r varies); Gauss's ...

Page 509, lines 5 and 6 (26 Sep 95)

3.29 $D\bigl(\alpha', \lfloor \alpha n \rfloor\bigr)$ is at most the maximum of the absolute value of

$$s\bigl(\alpha', \lfloor n\alpha \rfloor, \nu'\bigr) \;=\; -s(\alpha, n, \nu) - S + \epsilon + \{0 \text{ or } 1\} + \nu' - \{0 \text{ or } 1\}\,.$$

Page 512, line 5 from the bottom (8 May 96)

$(-1)^{[x(n)<y(n)]}$.

Page 520, lines 4–6 from the bottom (25 Apr 95)

4.49 (a) Either $m < n$ ($\Phi(N) - 1$ cases) or $m = n$ (one case) or $m > n$ ($\Phi(N) - 1$ again). Hence $R(N) = 2\Phi(N) - 1$. (b) From (4.62) we get

$$2\Phi(N) - 1 \;=\; -1 + \sum_{d \geqslant 1} \mu(d) \lfloor N/d \rfloor \lfloor 1 + N/d \rfloor\,;$$

Page 521, bottom line (24 May 96)

$$\bigl\lceil (n-1)!/(n+1) \bigr\rceil \;=\; \bigl((n-1)! + n\bigr)/(n+1)\,;$$

Page 525, line 4 of answer 4.69 (20 Jun 96)

in exercise 60 are the best that were known in 1994 [255]. Exercise 68

Page 530, line 15 (6 Jun 96)

for all $m > 0$ and $n > 0$, by induction on $m + n$.

Page 531, line 5 from the bottom (4 Jun 95)

$$\binom{n+a-1}{n} F\left(\begin{matrix} a, b, -n \\ c, a \end{matrix} \middle| 1\right) = \frac{a^{\overline{n}}}{n!} \frac{(c-b)^{\overline{n}}}{c^{\overline{n}}}$$

Page 532, new graffito for top of page (13 Jan 95)

Term limits?

Page 540, line 7 from the bottom (26 Sep 95)

quently, when $m \geqslant 0$ is an integer less than n, we have

Page 547, correction to first line of graffito (21 Jan 95)

Notice that $1/nk$

Page 551, lines 5–8 from the bottom (9 Jul 95)

valid for $k = n - 1$ if we write it in the form

$$\begin{aligned} &K_{m+n}(x_1, \ldots, x_{m+n})\, K_{n-1}(x_{m+n-1}, \ldots, x_{m+1}) \\ &\qquad = K_{m+n-1}(x_1, \ldots, x_{m+n-1})\, K_n(x_{m+n}, \ldots, x_{m+1}) \\ &\qquad\quad - (-1)^n K_{m-1}(x_1, \ldots, x_{m-1})\,. \end{aligned}$$

[Also delete '$k = 2$,' where it appears on the bottom line.]

Page 555, line 2 (1 Nov 94)

16735, and 102728. See the answer to exercise 92.)

Page 564, lines 13 and 14 (14 Jun 94)

$\left\{ {n \atop m} \right\} = \sum_k \binom{m}{k} k^n (-1)^{m-k}/m!$ for integer $m \geqslant 0$ and arbitrary $n \geqslant 0$; then (6.3) holds for all $n \geqslant 1$.

Page 564, lines 15 and 16 (1 Nov 94)

6.92 (a) David Boyd has shown that there are only finitely many solutions for all $p < 500$, except perhaps $p = 83$, 127, 397. (b) The behavior of b_n is quite ...

Page 568, new graffito for the answer to 7.23 (15 Aug 94)

"Curiously, a_{2n} is equal to U_{2n}^2, the square of the number of ways to tile a $3 \times 2n$ rectangle with dominoes; and $a_{2n+1} = 2V_{2n+1}^2$."
—I. Kaplansky

Page 578, lines 3 and 4 of answer 22 (13 May 96)

$\big(E\big(E(X|Y)\big)\big)^2$. But $E\big(E(X|Y)\big) = \sum_y \Pr(Y{=}y)E(X|y) = \sum_{x,y} \Pr(Y{=}y) \times \Pr\big((X|y){=}x\big)x = EX$ and $E\big(E(X^2|Y)\big) = E(X^2)$, so the result is just VX.

Page 581, correction to the graffito (18 Aug 96)

"Toto, I've a feeling we're not in Kansas anymore."
—Dorothy

Page 594, line 2 (9 Jul 95)

$-5.5/(\ln n)^2 + O(\log\log n/\log n)^3$; then we estimate $P_{1000000} \approx 15480992.8$.)

Page 597, line 4 of answer 9.40 (20 Jun 96)

$$\sum_{k=1}^{n/2} \frac{H_{2k}^{m-1}}{k} = \sum_{k=1}^{n/2} \frac{(\ln 2e^{\gamma}k)^{m-1} + O(k^{-1}(\log k)^{m-2})}{k}$$

Page 599, lines 1 and 2 (26 Sep 95)

for all m. Divide by n and let $n \to \infty$; the limit points are bounded above by $\alpha_1 \ldots \alpha_m$ for all m. Finally we have

Page 603, new graffito for answer 9.63 (31 Dec 97)

Additional progress on this problem has been made by Jean-Luc Rémy, Journal of Number Theory, vol. 66 (1997), 1–28.

Page 605, lines 16–20 (29 Mar 97)

15 M. D. Atkinson, "The cyclic towers of Hanoi," *Information Processing Letters* **13** (1981), 118–119. *633.*

16 M. D. Atkinson, "How to compute the series expansions of $\sec x$ and $\tan x$," *American Mathematical Monthly* **93** (1986), 387–389. [See also A. J. Kempner, "On the shape of polynomial curves," *Tôhoku Math. J.* **37** (1933), 347–362; R. C. Entringer, "A combinatorial interpretation of the Euler and Bernoulli numbers," *Nieuw Archief voor Wiskunde* **14** (1966), 241–246.] *635.*

Page 608, lines 22 and 23 (1 Feb 96)

59 F. R. K. Chung and R. L. Graham, "On the cover polynomial of a digraph," *Journal of Combinatorial Theory*, series B, **65** (1995), 273–290.

Page 612, line 10 (31 Dec 95)

lated into French, 1786; German, 1788; Russian, 1936; English, 1988.

Page 612, line 16 and following (31 Dec 95)

Analysi Finitorum ac Doctrina Serierum. St. Petersburg, Academiæ Imperialis . . .

Page 614, line 8 (1 Nov 96)

132 J. Franel, Solutions to questions 42 and 170, in L'*Intermédiaire des*

Page 614, line 11 (31 Dec 95)

minimal storage tree sorting," *Journal of the Association for Computing Machinery* **27** (1970), 496–507.

Page 615, line 12 (24 May 96)

145 Angelo Genocchi, "Intorno all'espressione generale de'numeri Bernulliani,"

Page 616, lines 5 and 6 from the bottom (12 Feb 96)

170 Inger Johanne Håland and Donald E. Knuth, "Polynomials involving the floor function," *Mathematica Scandinavica* **76** (1995), 194–200.

Page 619, after line 2 (27 May 94)

202 Johannes Kepler, letter to Joachim Tancke (12 May 1608), in his *Gesammelte Werke*, volume 16, 154–165.

[Items previously numbered 202, 203, and 204 are now numbered 203, 204, 205; the item previously numbered 205 has been dropped.]

Page 620, line 5 from the bottom (31 Dec 95)

229 E. E. Kummer, "Über die hypergeometrische Reihe

Page 622, lines 16 and 17 (11 Apr 96)

Stirling numbers of the second kind," *Discrete Mathematics* **150** (1996), 281–292.

Page 622, lines 18 and 19	(28 Mar 97)

249 Li Shan-Lan, *Duò Jī Bǐ Lèi* [Sums of Piles Obtained Inductively]. In his *Zégŭxī Zhaī Suànxué* [Classically Inspired Meditations on Mathematics],

Page 623, line 6	(10 Oct 97)

premier," *Bulletin de la Société mathématique de France* **6** (1877), 49–54.

Page 624, line 5	(31 Dec 95)

Zahlen," *Sitzungsberichte der Mathematisch-Naturwissenschaftlichen*

Page 626, line 18	(3 Aug 95)

308 Paulo Ribenboim, *13 Lectures on Fermat's Last Theorem.* Springer-

Page 626, line 5 from the bottom	(6 Mar 96)

313 Gian-Carlo Rota, "On the foundations of combinatorial theory. I. The-

Page 627, line 20	(31 Dec 95)

ence on Combinatorial Structures and their Applications, 1969.)

Page 627, lines 10 and 11 from the bottom	(1 Nov 96)

letin International de l'Académie Polonaise des Sciences et des Lettres (Cracovie), series A (1910), 9–11.

Page 627, line 6 from the bottom	(31 Dec 95)

328 Wacław Sierpiński, *A Selection of Problems in the Theory of Numbers.*

Page 628, lines 1 and 2	(1 Nov 94)

330 N. J. A. Sloane, *A Handbook of Integer Sequences.* Academic Press, 1973. Sequel, with Simon Plouffe, *The Encyclopedia of Integer Sequences*, Academic Press, 1995.

Page 628, lines 4 and 5	(4 Mar 96)

331 A. D. Solov'ev, "Odno kombinatornoe tozhdestvo i ego primenenie k zadache o pervom nastuplenii redkogo sobytiia͡," *Teoriia͡ veroiа͡tnosteĭ*

Page 629, lines 1 and 2	(21 Jan 95)

344 Volker Strehl, "Binomial identities — combinatorial and algorithmic aspects," *Discrete Mathematics* **136** (1994), 309–346.

Page 630, bottom line	(21 Jan 95)

373 Herbert S. Wilf, *generatingfunctionology.* Academic Press, 1990; second edition, 1994.

Page 633, left column	(26 Sep 96)

1.10 Atkinson [15].

Page 635, left column	(26 Sep 96)

6.75 Atkinson [16].

Page 635, left column	(2 Oct 97)

6.76 [209, answer 5.1.3–3]; Lengyel [248].

Page 635, right column	(13 Jan 95)

6.86 [226].

Page 636, missing entry	(8 May 96)

8.45 1985 final exam.

Page 638, left column	(26 Sep 96)

[remove the reference to V. I. Arnol'd]

Page 638, right column	(26 Sep 96)

Atkinson, Michael David, 605, 633, 635.

Page 639, right column	(7 Jul 97)

Blom, Carl Gunnar, 606, 636

Page 639, right column	(23 Jan 95)

Boyd, David William, 564

Page 640, left column	(27 Oct 97)

Cassini, Gian (= Giovanni = Jean) Domenico (= Dominique), 292, 607

Page 641, left column	(18 Dec 96)

Concrete Math Club, 74, 453

Page 642, left column	(1 Oct 94)

Dirichlet, Johann Peter Gustav Lejeune, 370, 610, 633

Page 643, left column	(28 Dec 96)

Entringer, Roger Charles, 605

Page 645, left column	(1 Oct 94)

Gauß (= Gauss), Johann Friedrich Carl (= Carl Friedrich), vii, 6, 7, . . .

Page 647, right column	(29 Mar 97)

Kempner, Aubrey John, 605

Page 648, left column	(28 Mar 97)

Lǐ Shànlán Rénshū (= Qiūrèn), 269, 622

Page 648, right column	(15 Apr 96)

Minkowski, Hermann, 122

Page 650, right column	(29 Aug 96)

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change ‘indispensible’ to ‘indispensable’.