pitch intervals in the standard chromatic scale. Thus the ratio of 3:1 is approximated very well by 19 semitones, but that of 5:1 fares much worse since it becomes appreciably sharp. But really the significant point the author is making is that only powers of 2 will result in perfect tuning. The fact that the circle of fifths depends on the fact that 3^{12} is approximately 2^{19} does not seem to me to be particularly difficult to grasp, but in this text a remarkable amount of time and effort is spent on the fact that powers of two are not multiples of any other primes. I could not help thinking that the quite considerable mathematical framework which is developed for this is actually overkill.

There are some nice touches. The fact that the diatonic scale has eight notes, and therefore seven intervals of either tones or semitones, means that all the modes have a unique key signature. This is because it is impossible for any such sequence to contain a non-trivial cyclic permutation of itself. However, if we were working with nine notes, and hence eight intervals (which must sum to 12 semitones) the sequence of intervals $1, 1, \frac{1}{2}, \frac{1}{2}, 1, 1, \frac{1}{2}, \frac{1}{2}$ would be ambiguous as to its key signature. And there is a guide to writing serial music by constructing a row chart of note classes, which includes a composition using seven-tone equal temperament. The final chapter looks at alternatives to well-tempered tuning, such as the Pythagorean scale, just intonation and the mean-tone scale, but argues that the disadvantages (and particularly the difficulties in transposition) outweigh any minor benefits of such systems.

So, if you want a textbook which goes into a lot of depth about the mathematics of intervals, this might well appeal to you. However, you won't find much on musical form or the mechanics behind sound production or avant garde compositional techniques favoured by modern British musicians. And you might also feel that you don't need reminding about algebraic structure or elementary number theory. If you are after a lighter touch and a broader sweep, perhaps you would do better to look elsewhere.

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Riot at the calc. exam and other Mathematically Bent stories, by Colin Adams. Pp. 271. \$32. 2009. ISBN 978-0-8218-4817-3 (American Mathematical Society).

This unusual book contains 33 of the author's short, humorous, mathematically-themed stories, together with background notes on 15 of them. Most of the stories first appeared in the column 'Mathematically Bent' in the *Mathematical Intelligencer*; some have been performed as skits at mathematics conferences.

The stories are whimsically amusing rather than laugh-aloud funny. They range from parodies of familiar tales (such as Rumpled Stiltsken 'turning coffee into theorems' and The Three Little Pigs trying to prove three of the Millennium problems), through extended metaphors (for example, where proving a big theorem is likened to a sea voyage or climbing a mountain or giving birth to a baby), to more in-house (and in-joke) pieces on what being a mathematician is like, both individually and professionally (including the Jekyll and Hyde flip over between teaching and doing research). Several revolve around mathematical nightmares: the theorem with an unfixable lemma or embarrassing counterexample, the crank whose proof turns out to be correct, the exam room as battlefield, and the unsympathetic teacher who is the scourge of their classes (and the cause of the 'Riot at the calc. exam'). Other stories will receive a knowing nod from anyone involved in administration: the borderline exam mark challenged in a court of law, the risk assessment for a mathematics department, the telephone interview, the tensions in a hiring committee, and the moral dilemmas for the 'mathematical ethicist'. Some, hopefully, will remain in the future: overt product sponsorship for maths contests and drugs testing for recipients of mathematics prizes.

The stories vary in length, ingenuity and sophistication. I enjoyed the Hitchcock-like darkness of 'The integral: a horror story', the central conceit of 'Journey to the centre of mathematics' (which is revealed to be the empty set), the lure of 'A killer theorem' – a problem so enticing that algebraists stop eating and die once they are hooked by it, and the sheer silliness of 'class reunion' in which functions punningly socialise at the level of 'So e^x is your ex.'. The mathematics employed in this collection ranges from actual mathematics quoted or modelled accurately, through real mathematics used figuratively '(the big theorem) would make Riemann-Roch look like Zorn's Lemma', to pseudo-mathematics (which sounds plausible, but is essentially gibberish) and spoof mathematics (which sounds plausible, but is silly, 'A subprime is a prime number that is a factor of a larger prime.').

As with all humour, reactions to this book will vary from individual to individual. It is a quick, light read but, for my own tastes and risking the accusation of exhibiting Snark-like tendencies, I found the humour in many of the stories to be rather forced. There are a few typos – Leibniz is misspelt twice and $\zeta(2)$ purports to be $\frac{\pi^2}{4}$ on page 235 – and I would really like to know whether the mislabelling of the curve $y = x^2 - 2x$ on the cover and frontispiece is a mistake or a joke!

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Those fascinating numbers, by Jean-Marie De Koninck. Pp. 426. £34.95. 2009. ISBN: 978-0-8218-4807-4 (American Mathematical Society).

This book consists essentially of a list, in numerical order, of some of the positive integers from one to the *Skewes number*, highlighting any 'interesting' properties they may possess. Needless to say, most numbers in this enormous interval have been omitted! The smallest number missing from the list is 95, and, a bit like the behaviour of the primes, the included numbers tend to get more spread out as we proceed through the book. As might be expected, the latter part of the book is littered with large perfect numbers and Mersenne primes (including large prime *repunits*).

The material has not been partitioned into sections or chapters; instead it comprises a continuous list with anything from one to ten numbers occupying a single page. This structure (or lack of it) would seem to be fairly sensible, given that the numbers are presented in numerical order. However, an alternative might have been to group them according to their highlighted properties, in which case the utilisation of themed chapters could have been deemed appropriate.

There is very much a number-theoretic flavour to the book, with many of the properties being related to well-known arithmetic functions such as ϕ and σ, denoting *Euler's phi function* and the *sum-of-divisors* function respectively. Some rather more obscure arithmetic functions also make the odd appearance. Many of the numbers on the list are there by virtue of being the smallest or the largest integer with some particular property. Here are several examples to give the reader an idea of the content:

(1) 17907119 is the smallest positive integer n satisfying the equation $\phi(n) = 5\phi(n + 1)$ (p. 302).

(2) 168 is the largest-known integer k such that the decimal expansion of 2^k does not contain the digit 2 (p. 50).