

(Download free ebook) Towing Icebergs, Falling Dominoes, and Other Adventures in Applied Mathematics (New in Paperback) by Robert B. Banks (Feb 24 2013)

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#File Name: B00DEKQF02 | File size: 69.Mb

From Princeton University Press : Towing Icebergs, Falling Dominoes, and Other Adventures in Applied Mathematics (New in Paperback) by Robert B. Banks (Feb 24 2013) before purchasing it in order to gage whether or not it would be worth my time, and all praised Towing Icebergs, Falling Dominoes, and Other Adventures in Applied Mathematics (New in Paperback) by Robert B. Banks (Feb 24 2013):

0 of 0 people found the following review helpful. Dumb title; interesting and useful content.By CharlesThis is a book for people who wonder how engineers do what they do. It's not easy - but for those who like to evercise their mind, this is a great book.54 of 55 people found the following review helpful. Adventures in applied mathematicsBy Duwayne AndersonMathematics has been called the universal language. After reading Bank's book you might believe it's so. Banks takes the reader on a whirlwind tour of mathematical applications to a broad range of every-day events and phenomena. In doing so he exposes the reader not only to some fun and interesting mathematics but also to a better appreciation of analysis and how broadly it applies to our lives.As the title says, this is a book on applied mathematics. To read and enjoy it you need to understand basic integral calculus and solutions to differential equations. There's also a smattering of algebra, trigonometry, and geometry.One of the first things I noticed about the book is the breadth and scope of the topics. Banks does not live in a single corner of the world, but has obviously

striven to sample a wide variety of mathematical applications in some remote corners of the world. There is, as the cover suggests, a mathematical treatment of towing icebergs, complete with cost and structural engineering analysis. This happens relatively close to the beginning of the book. Nearer the end of the book Banks has a chapter devoted to the science of waves in falling dominoes. In between is a wide selection of other topics, including quite a bit on exponential growth, both limited and unlimited, and its applications to lots of natural systems including alligator eggs, GNP, and deficit spending. Banks does more than simply describe physical problems and write down their differential equations. He also does a good job of explaining the phenomena. Nor do integrals and differential equations describe all the problems. A significant portion of the book, for example, is devoted to statistics and related things like curve fitting. And he does not forget the social sciences, either. Banks touches on such subjects as how to start a football game, a better way to score the Olympics, how to calculate the economic energy of a nation, and how to reduce the population. I found these subjects quite interesting, though I think the linear curve fit he used in the section on scoring the Olympics stretches my imagination. [To me, the data look pretty random. Indeed, the correlation coefficient is only slightly more than 0.5 (see figure 8.1 and correlation coefficient after equation (8.1)). Still, Banks (as if driven by a preconceived objective) presses on and applies a linear regression from which he later derives key results for his scoring method.] For the sports-minded among you Banks offers lots of examples of applied mathematics in the fields (pun intended) of baseball, golf, track, basketball, jumping rope, ski jumping, and the shot put. For example, did you know that a child jumping rope is swinging a curve called a troposkein? Furthermore, the troposkein is useful in vertical-axis wind turbines because the shape eliminates compression and bending forces. So the next time you see the kids jumping rope, tell them how to chant "one troposkein, two troposkein ..." instead. It will be an opportunity to teach them some mathematics as well as really impress their teachers. Most of the sports examples involve problems with air. Air causes drag, which is usually a problem to be fought in sports, but it also causes lift, which can be either a problem (as in the hook and slice in your game of golf) or an advantage (as in your curve or knuckle ball in baseball). I particularly enjoyed the discussion of aerodynamics and its application to ski jumping. Seriously, this is one book you want to read before the next Olympics. There are also brief forays into architecture, meteorites, and wave phenomena. Do you know why the Eiffel Tower looks the way it does? How about the Gateway arch in Saint Louis? If not, you can find the answers in chapter 13. Want to know when to run for cover if a large meteor is heading our way? Then read chapters 4 and 5. Ever wonder why a tsunami causes widespread destruction on land but does not seem to be even noticed by ships at sea? Then you won't want to miss chapter 21. The constant theme throughout this book (though Banks never states it explicitly) is that mathematics is the universal language. Through its magic we understand and control our world. In addition to being a great book for subject and clarity, the book also has a nice presentation. The equations are all numbered. Failure to number equations was a complaint I had about "The Story of root minus one," by Paul J. Nahin (Nahin, by the way, is quoted on the back cover). Banks is also a walking treasure chest of other references. If any of the subjects he touches upon interest you, then run (don't walk) to the bibliography. You will find lots of references there for further (usually more detailed) discussions and treatments of the subjects Bank's covers. The book is also pretty accurate. I found only minor typographical errors like the missing equal sign in equation (19.6) and a typo on table 20.2. Another thing I liked about the book is the way Banks leaves lots of the derivations to the reader. Sometimes these derivations involve a page or two of scribbles (like the one for equation 17.22). The book also has problems and suggested research topics for students. This would be a great idea book for students in mathematics, physics, and engineering. About the only complaint I have is that the book's index is miserly. Use lots of yellow markers, dog-ear the pages, and you may want to have some sticky notes around as well when you read it. So, if you love mathematics and especially applied mathematics I highly recommend this book. I guarantee you will enjoy it.

Duwayne Anderson Saint Helens November 23, 1999

10 people found the following review helpful. Fun and informative; some clumsy writing

By Mike Christie

Popular math books like this one, covering applied mathematics instead of pure, are a rarity. Banks has done a fair job of putting together interesting essays on various topics, though he's frankly not a very good writer. His topics do a lot of the work for him, though. For example, he spends a couple of chapters on the engineering problems associated with towing and melting a large iceberg to provide fresh water. It's neat to watch him make his way through one question after another: what's the great-circle distance from the Antarctic to Los Angeles? When you stop towing it, how long till it coasts to a stop? How do you melt it? Can you get useful energy out of the heat difference between it and its surroundings? Banks' ease with numbers is contagious, and reading this one can see just how powerful applied mathematics is, and how many questions you can ask--and answer. However, it's not for everyone. I have a pure maths degree, and am not particularly scared of a differential equation, but I found myself skimming the innumerable equations and calculations. Which is OK: you can just let your eyes glaze over at the symbols and still pick up the narrative. You'll get the idea of what can be done; you just won't really understand how. But this is not really a book to teach people who don't already know these techniques. It's a fun book if you already like maths, and a terrific book if you enjoy engineering calculations, but it's not likely to make many converts. One extra point I'd like to make: a couple of times, Banks brings up a really interesting idea that highlights very effectively just how powerful and surprising mathematics can be. My favourite is the calculation of the economic energy of a nation, which is an offshoot of Banks' analysis of the success of smaller nations at getting

Olympic medals (interestingly, Cuba is by far the most successful Olympic nation according to his numbers). Let P be a nation's population in millions, and G the gross domestic product in billions of US dollars. Then E , the economic energy of a nation, is $(PG^2)/2$, or one half times P times G squared. This is analogous in form to the standard equation for kinetic energy, with population substituted for mass, and GDP for velocity. Banks goes on to present a whole series of analogies between the two fields, and calculates comparisons of economic power, energy and momentum for the US, Europe and elsewhere. It's a fascinating excursion. I've only given the book three stars, partly because Banks' style, while endearing, is awfully clunky, and partly because the book has such a very narrow appeal. But if you know what a differential equation is, if you think it's interesting to try out calculations and compare results, and particularly if you enjoy seeing just what the engineering mindset can do, you should give this a try.