



How Round Is Your Circle?: Where Engineering and Mathematics Meet

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How do you draw a straight line? How do you determine if a circle is really round? These may sound like simple or even trivial mathematical problems, but to an engineer the answers can mean the difference between success and failure. *How Round Is Your Circle?* invites readers to explore many of the same fundamental questions that working engineers deal with every day--it's challenging, hands-on, and fun.

John Bryant and Chris Sangwin illustrate how physical models are created from abstract mathematical ones. Using elementary geometry and trigonometry, they guide readers through paper-and-pencil reconstructions of mathematical problems and show them how to construct actual physical models themselves--directions included. It's an effective and entertaining way to explain how applied mathematics and engineering work together to solve problems, everything from keeping a piston aligned in its cylinder to ensuring that automotive driveshafts rotate smoothly. Intriguingly, checking the roundness of a manufactured object is trickier than one might think. When does the width of a saw blade affect an engineer's calculations--or, for that matter, the width of a physical line? When does a measurement need to be exact and when will an approximation suffice? Bryant and Sangwin tackle questions like these and enliven their discussions with many fascinating highlights from engineering history. Generously illustrated, *How Round Is Your Circle?* reveals some of the hidden complexities in everyday things.

How Round Is Your Circle?: Where Engineering and Mathematics Meet Details

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Jeffrey says

If you exclude the preface and the afterword, this is a wonderful book full of delightful examples of the difficulties of trying to make simple mathematical objects in the real world. Every moment I was reading this book I was itching for paper, pencils, straight edges, compasses, bars of iron, and other materials to try it myself. What greater praise can there be for a math book than "it made me want to try it myself" ?

Arav Agarwal says

Honestly really good

Nick says

Skimming it now. Some topics are fascinating and this is a great intro to linkages for instance. Other topics are just tedious.

Alan Marchant says

The subtitle is a bit overstated. It really should read "where geometry meets mechanical design." The primary emphasis is on design principles that make for successful fabrication - the sorts of lovely insights that are rapidly being lost in our brave new world of CAD and 3D printing. The authors' approach is to start with idealized problems and then show how interesting they become with just a layer or two of realism.

Michael Davis says

It wasn't as easy to read as I thought it might be. It was interesting, but sometimes went off into areas I didn't really care about.

Matjaž Leonardis says

This is one of the best mathematics books out there. It sheds light on many problems that actually lead to thinking about mathematics in the first place. There should be more books like that.

Jim Good says

Describes engineering ways to view mathematical problems. Spends a chapter describing how to make a straight edge and another on how to establish a measurement system. Some are very interesting, but in general dry and a challenge to remember old algebra equations.

Nick says

Honestly, I only skimmed it. But the constructions are fascinating, and probably worth returning to some other day.

William Schram says

This book is an interesting inspection into the practical problems of Engineering. While Mathematics is somewhat esoteric and deals with imaginary solutions and ideas, the consequences of Mathematics is very real. This book takes some problems in Engineering that might be trivial to a Mathematician and puts it into a real-world setting. For instance, how does one draw a straight line? With a Ruler or a Straight Edge, this answer is quite simple, but how does one produce a straight edge in the first place?

With plenty of projects and ideas for hands-on learning, this book can make an invaluable addition to your library.

Michael says

Fascinating if you have the math - geometry, a bit of calculus, lots of trigonometry, and a bit of logarithms. Makes me want to dig out my Erector set and build linkages.

Steven Monrad says

Desert island book if you like math

Koen Crolla says

Like maybe a non-zero amount of people, I found out about this book through that Grand Illusions video trying to sell aluminium solids of constant width for a slightly ridiculous price, but that turned out to be one of the less interesting parts of the book.

The point Bryant and Sangwin try to make is that engineering challenges sometimes require a non-trivial

amount of mathematics to solve, which is fair enough. Most of the actual subjects they discuss don't require more than middle-school mathematics, but they cover some ground that your average maths enthusiast might not have any experience with—among others, how to draw a straight line using linkages, how and why planimeters work (including the hatchet planimeter, which you wouldn't expect to), what shape a hanging chain assumes, and, yes, how to determine whether your round thing is sufficiently round.

It's not necessarily always clear what point they're trying to make, and a few subjects feel like they were only included because the authors were particularly proud of the wooden models they built for it, but there's enough novelty here to keep me entertained. If nothing else, this book finally convinced me to buy a slide rule.
