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About The Author

Dr. Meyer received his Ph.D. in physics from Case Western Reserve University in 1989. Over the next ten years, he worked as a Research Scientist for Imperial Chemical Industries (ICI). While at ICI, he was a successful problem-solver for industrial and manufacturing facilities around the globe. One of his missions at ICI was to recruit new problem-solving talent. Too often, the candidates he interviewed were full of knowledge, but lacked basic problem-solving skills—that is, the ability to effectively tackle a NEW problem. The lack of problem-solving ability in recent college and university graduates is the result of students being given answers to remember, rather than problems to solve.

As a result, Dr. Meyer left his position at ICI and went back to academia to teach problem solving. He now teaches two levels of Problem Solving to undergraduates at Baldwin-Wallace College in Berea, Ohio as well as “Problem Solving in Business,” a special topics course within the graduate business program.

This book contains many of the problems Dr. Meyer uses in his coursework and lectures. The problems are stated simply and require no formal training in physics, mathematics, or engineering, only a basic knowledge of how the world works and the ability to reason logically.

The problems will provide hours of entertainment for those who enjoy an intellectual challenge. All readers—irrespective of their “score”—will increase their knowledge of the natural world as a result of reading this book.

For more about problem solving and critical thinking, visit:

Website: edmeyer.phd

X: https://x.com/Gedanken_Inst

Introduction

The sixty-four problems contained in this book were chosen based on the simplicity with which they can be posed and the lack of formal mathematics and physics training needed to solve them.

If you need a little direction to solve a particular problem, there is a one-sentence hint at the bottom of every page that may trigger a connection or start you down the right path toward the solution. To get full value from this book, it is recommended that you not look at the hints nor the answers until a significant amount of time has been invested thinking about the problem. If you peek at the answers early, you will have lost an opportunity to develop your problem-solving ability.

One idea to help increase the time you invest thinking about the problems is to work together with a friend or two; these problems are ideal to work out in a group. Indeed, many of these problems have been used in team-building exercises for corporate management.

Whether you solve the problems by yourself or in a group, the important thing is to have fun while developing your problem-solving skills.

Acknowledgments

In a book such as this, the clarity of the answer section is crucial. Besides the correct answer, the answer section should provide the reader with a fundamental understanding of the concept so the reader can apply it in similar situations. To this end, I teamed up with my father, a retired professor, to write the answer section. Our goal was to provide a clear explanation of the problem using related examples from everyday life without using confusing technical jargon.

Once a draft of the answer section was written, it was edited by three of my siblings, Joseph A. Meyer, Thomas P. Meyer, and John J. Meyer. The solutions often underwent many iterations before everyone was satisfied. I would like to thank them for their insightful contributions, criticisms, and encouragement.

Finally, I would like to thank the hundreds of students I had while teaching physics at Case Western Reserve University and both physics and problem solving at Baldwin-Wallace College. It was their excitement and passion for solving the problems that motivated me to collect the problems in a book so more people could enjoy them.

Edwin F. Meyer III

Rolling Rotation

The motion of a child's tricycle seems relatively simple. The pedals rotate with the front tire in a one-to-one ratio. That is, for each revolution of the pedals, the front wheel goes around once. Also, if the child pedals backward, the tricycle will roll backward. With all that in mind, think about the following problem:

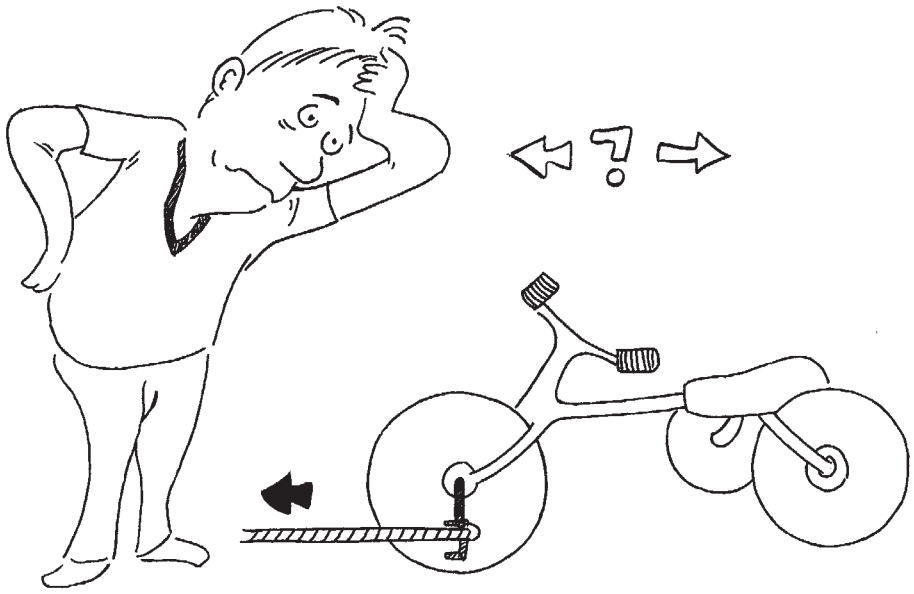
A rope is tied to a pedal of a child's tricycle. The front tire is then rotated so that the pedal with the rope attached is in its lowest position (see figure). Assuming the front tire does not slip over the ground, which way does the tricycle roll when the rope is pulled forward?

Note: Since the tire doesn't slip along the ground, it must rotate clockwise (see diagram) if the tricycle moves backward (to the right in the diagram), and it must rotate counter-clockwise if the tricycle moves forward (to the left in the diagram).

a. Forward

b. It won't move

c. Backward



HINT: When a child rides a tricycle, what is the motion of the front pedal with respect to the ground? Specifically, do they ever move backward?