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Adam, John A.
X and the city. Modeling aspects of urban life.
Princeton, NJ: Princeton University Press (ISBN 978-0-691-15464-0/hbk; 978-1-4008-4169-1/ebook). xviii, 319 p. (2012).

The new book by Professor Adam is an excellent companion to his award winning titles [A mathematical nature walk. Princeton, NJ: Princeton University Press (2009; Zbl 1181.00024; ME 2010b.00063)] and [Mathematics in nature. Modeling patterns in the natural world. Princeton, NJ: Princeton University Press (2006; Zbl 1102.00004; ME 2013b.00070)]. This time the reader is invited to take an urban walk exploring no less intriguing problems that arise in mathematical modeling of daily city life. According to the author's description, "this book is an eclectic collection of topics ranging across city-related material, from day-to-day living in a city, traveling in a city by rail, bus, and car (the latter two with their concomitant traffic flow problems), population growth in cities, pollution and its consequences, to unusual night time optical effects in the presence of artificial sources of light, among many other topics." In a very enjoyable manner, a variety of simple and not-so-simple routine daily situations are first set into the mathematical frame and then skillfully analyzed using arguments ranging from straightforward "quick and dirty" computations to delicate combinations of estimations, probability, geometry, discrete and continuous modeling. Using thoroughly selected real problems, John Adam nicely illustrates the three fundamental steps of mathematical modeling – model's mathematical formulation, problem's analysis and solution, and solution's interpretation in the original setting. Practical questions answered in the book include, for instance, the following. What is the average distance traveled in a city/town center? How does gasoline consumption vary with speed? How long does it take to cook a turkey (without solving an equation)? What is the optimal distance from which to view a painting/sculpture/display? On the list of less standard problems, one can find estimates for the number of doctor's offices in one's town, evaluation of the number of squirrels in Central Park, computation of the likelihood of a city/town being hit by an asteroid, and many other curious questions provided with elegant and instructive explanations. Some questions are left without answers as exercises for an interested reader. The knowledge of mathematics required from the reader varies from arithmetic and single-variable calculus to ordinary and, on times, partial differential equations. The book has an extensive bibliography; numerous helpful diagrams and illustrations are spread throughout the text. There is also a concise but useful index in the end. It goes without saying that the exposition is very friendly and lucid: this makes the vast majority of material accessible to a general audience interested in mathematical modeling and real life applications. This excellent book may well complement standard texts on engineering mathematics, mathematical modeling, applied mathematics, differential equations; it is a delightful and entertaining reading itself. Thank you, Vickie Kern, the editor of *A mathematical nature walk*, for suggesting the idea of this book to Professor Adam – your idea has been delightfully implemented!   *Svitlana P. Rogovchenko (Kristiansand)*

Classification: M10 A80
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