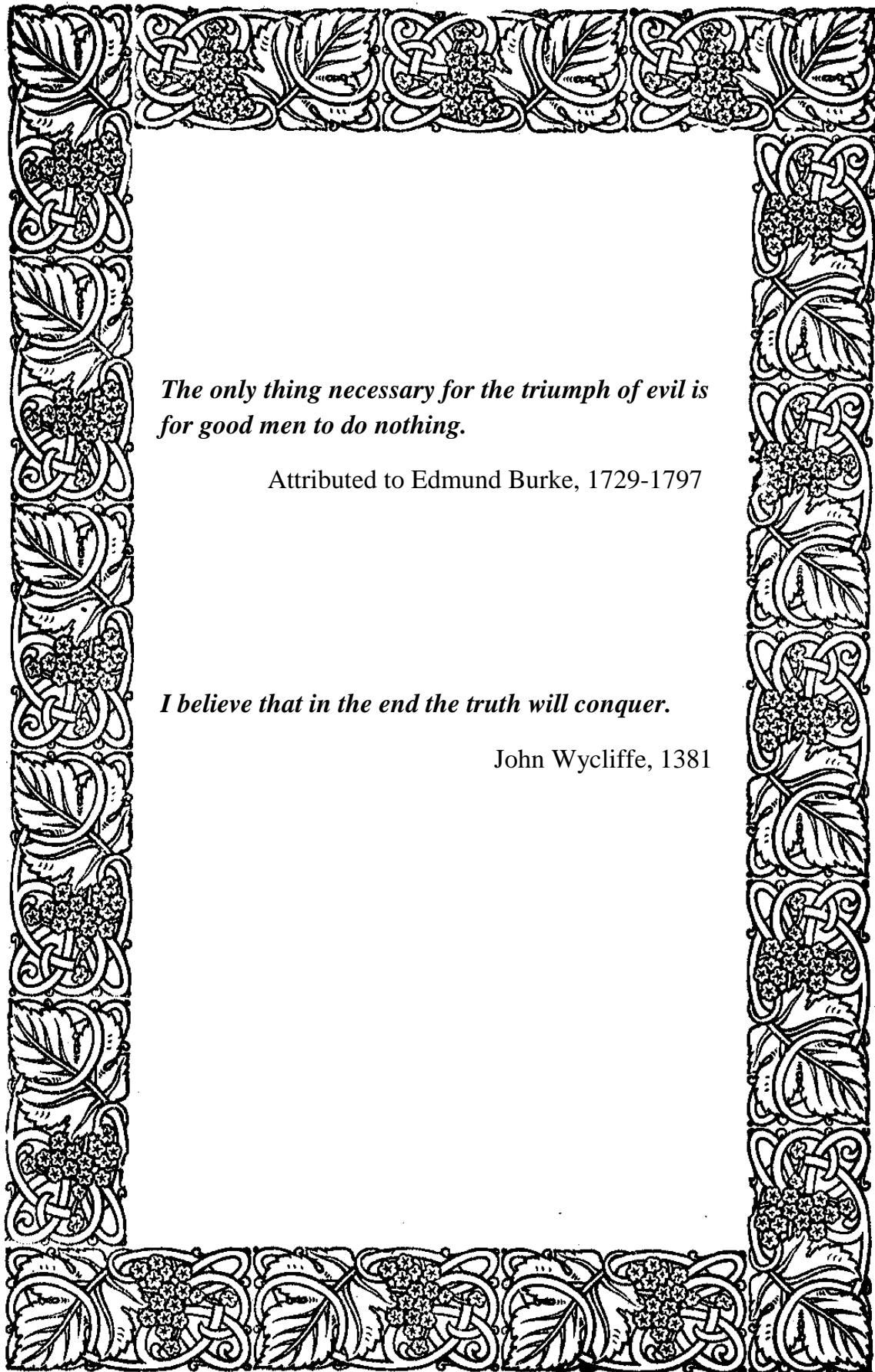


(*mathematics*)  *inEconomics*

Mathematical Methods in Economics: Problems and Solutions

Introduction



*The only thing necessary for the triumph of evil is
for good men to do nothing.*

Attributed to Edmund Burke, 1729-1797

I believe that in the end the truth will conquer.

John Wycliffe, 1381

Page border from an edition of 'The King of the Golden River' by John Ruskin published as a pamphlet by James Brodie Limited. Illustrator and publication date unknown.

Introduction

This book consists of a set of problems together with the worked solutions. In addition, so that it is possible to check an answer to a problem before looking at the worked solution, the answers are included separately. For some problems the worked solutions include notes that expand on a mathematical or economic aspect of the problem. An important objective of these notes is, where relevant, to clarify issues sometimes not discussed in conventional mathematical textbooks. For example, the different forms of notation used to represent a derivative or the difference in the way a mathematical concept or technique is commonly presented in a mathematics textbook and the way it is used in economic analysis, as with the use of q_d and G rather than x and y to represent variables. Instead of using one form of notation throughout this book the problems have been written to reflect the alternative ways that mathematical material may be presented in different economic textbooks. Sometimes the notes are used to show an alternative method to that given in the worked solution by which the solution to a problem may be found.

The problems are written principally for students studying for a degree in economics and taking a module in mathematics. Most of the mathematical techniques included are taught on first year modules but at some universities the more advanced techniques are taught in the second year. The problems are arranged in nine chapters on the basis of the mathematical techniques needed to find the solution. The chapters are arranged in the order in which these techniques are often taught on first year mathematics modules. In each chapter the exercises get progressively harder mainly in terms of their mathematical complexity but exercises that involve more advanced economic concepts or of a general form are also placed towards the end of the relevant chapter. The harder exercises are suitable for students with an A level in mathematics. A problem may not require a graph to be drawn but in the worked solution to some problems one is often included to help interpret and understand the problem.

This book is not aiming to teach mathematical techniques but to show how these techniques can be applied in the context of economics and to help develop the ability to apply them to different types of problems. Knowledge of the mathematical techniques and of some areas of economic analysis taught at first year level is, therefore, needed to be able to attempt them.

There is almost always more than one way of finding the solution to a problem. The worked solution given in this book for a particular problem, therefore, only shows one possible approach and is not intended to indicate that the problem *has* to be solved in that way. The answers to all problems are given at the end of the book. The best approach when trying to solve a problem is to find a solution and check if the answer obtained is correct. If it is not correct and, if after some more work the correct answer still cannot be found, look at the worked solution. There is nothing whatsoever to be gained by looking at the worked solution before an attempt has been made to find the solution to a problem.

Mathematical symbols and letters from the Greek alphabet used in this book

Mathematical symbols

Symbol	Meaning
\therefore	therefore
\approx	approximately equal to
\equiv	identically equal to
$<$	less than
$>$	greater than
\leq	less than or equal to
\geq	greater than or equal to
\Rightarrow	implies
\pm	plus or minus
e	the exponential constant
∞	infinity

Letters from the Greek Alphabet

Capital	Lower case	Name
A	α	alpha
B	β	beta
Δ	δ	delta
E	ε	epsilon
H	η	eta
Θ	θ	theta
Λ	λ	lambda
M	μ	mu
N	ν	nu
Π	π	pi
P	ρ	rho
Σ	σ	Sigma