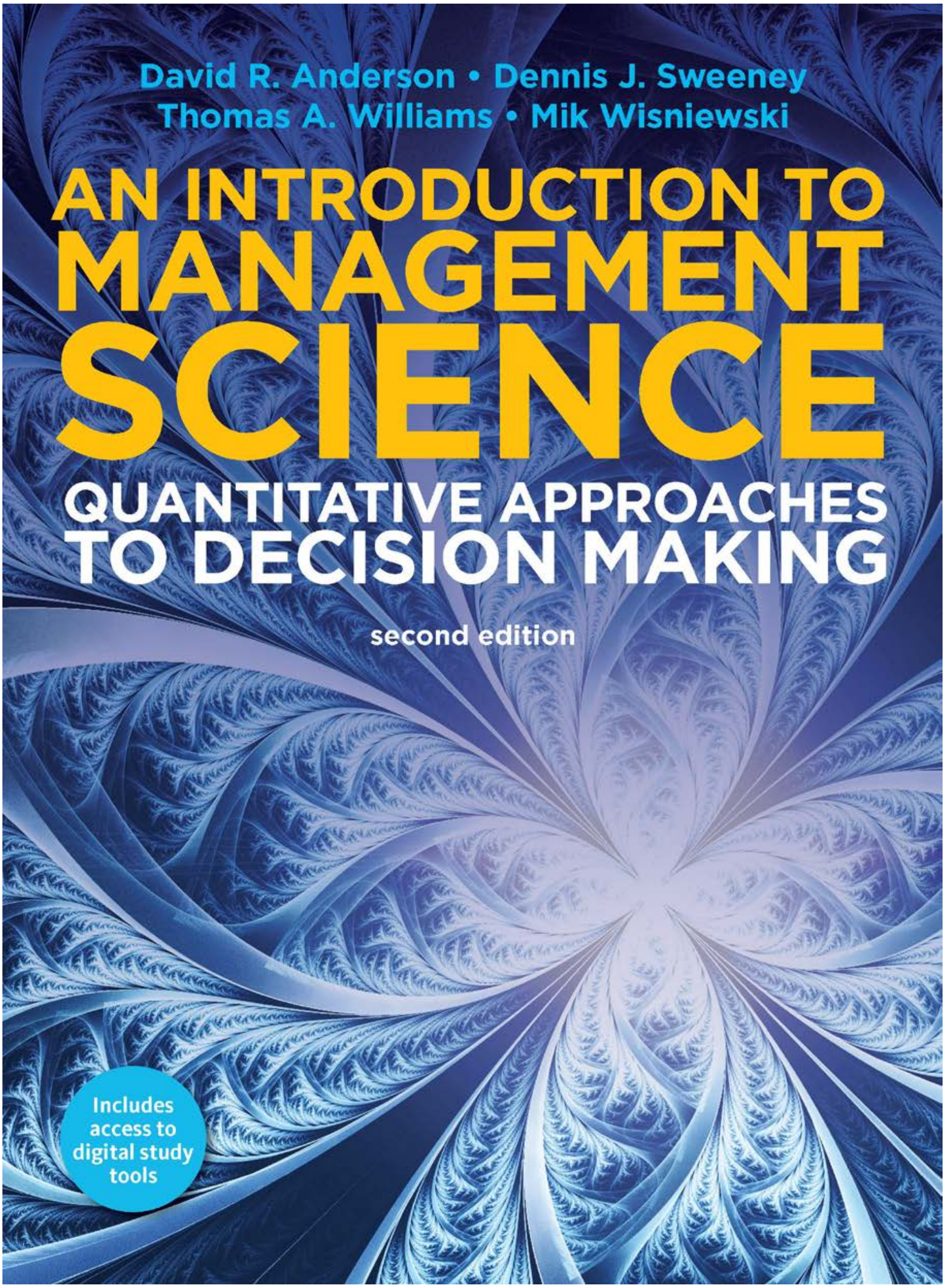

SOLUTIONS MANUAL

An Introduction to Management Science 2 e with CourseMate ISBN 9781408088401

Introduction to Management Science
Quantitative Approaches to Decision Making 2 e

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Note

This Solutions Manual contains solutions to those end-of-chapter problems not contained in the Appendix D answer section in the printed book.

Chapter 1: Introduction

1-1 The key stages are:

- Problem recognition
- Problem structuring and definition
- Modelling and analysis
- Solution and recommendation
- Implementation

1-3 A quantitative approach should be considered because the problem is large, complex, important, new and repetitive.

1-. Model (a) may be quicker to formulate, easier to solve, and/or more easily understood.

1.7

a) $x + y$

b) $0.2x + 0.25y$

c) $0.55x + 0.50y$

d) $x + y \leq 5000$

e) $x \leq 4000$
$y \leq 3000$

f) Maximize $0.55x + 0.50y$

Subject to
$x + y \leq 5000$
$x \leq 4000$
$y \leq 3000$

1-9
a. $TC = 1000 + 30x$

b. $P = 40x - (1000 + 30x) = 10x – 1000$

c. Breakeven when $P = 0$
Thus $10x - 1000 = 0$
$10x = 1000$
$x = 100$

1-11
a. Profit = Revenue - Cost
$= 20x - (80,000 + 3x)$
$= 17x - 80,000$

Break-even point

$17x - 80,000 = 0$

$17x = 80,000$

$x = 4706$

b. Loss with Profit = 17(4000) - 80,000 = -12,000

c. Profit = $px - (80,000 + 3x)$

$= 4000p - (80,000 + 3(4000)) = 0$

$4000p = 92,000$

$p = 23$

d. Profit = \$25.95 (4000) - (80,000 + 3 (4000))

= \$11,800

Probably go ahead with the project although the \$11,800 is only a 12.8% return on the total cost of \$92,000.

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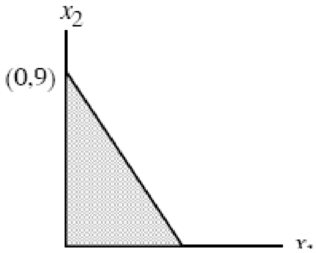
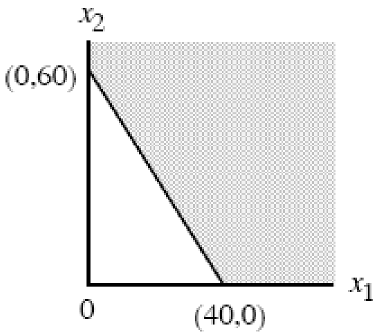
Chapter 2: An Introduction to Linear Programming

2-3.

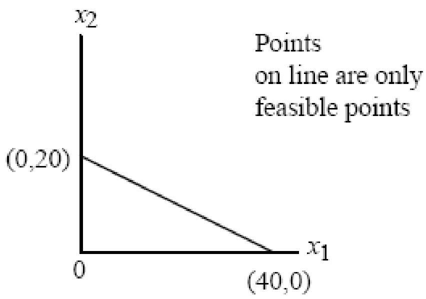
a.



b.

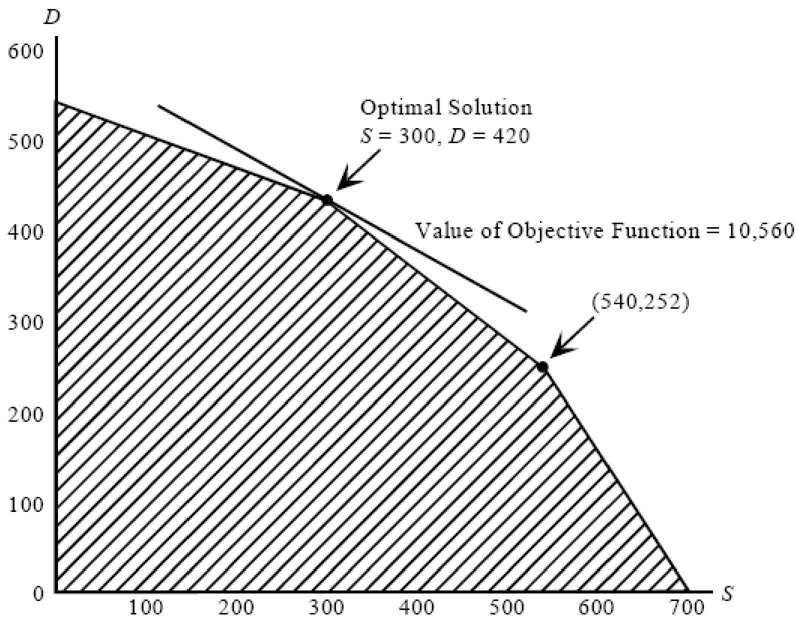


c.



2-10

a.



b. Similar to part (a): the same feasible region with a different objective function. The optimal solution occurs at (708, 0) with a profit of 20(708) + 9(0) = 14,160.

c. Similar to part (a): the same feasible region with a different objective function. The optimal solution occurs at (708, 0) with a profit of 20(708) + 9(0) = 14,160.

2-14

a.

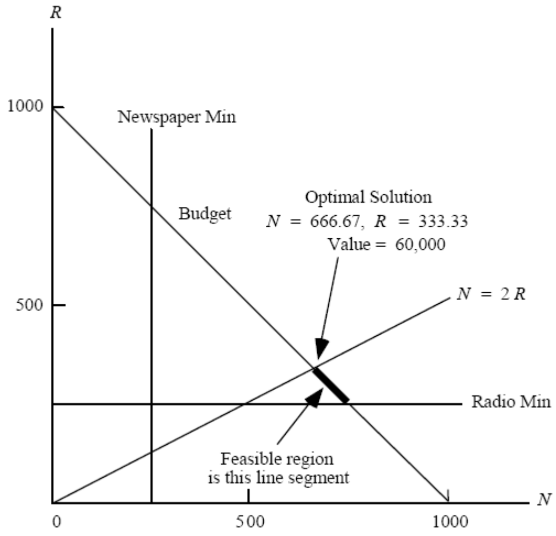
Let N = amount spent on newspaper advertising
R = amount spent on radio advertising

Max $50N + 80R$

s.t.

$N + R$	=	1000	Budget
N	≥	250	Newspaper min.
R	≥	250	Radio min.
N	≥	$2R$	News ≥ 2 Radio
N, R	≥ 0		

b.


R
1000
500
Newspaper Min
Budget
Optimal Solution
N = 666.67, R = 333.33
Value = 60,000
N = 2 R
Radio Min
Feasible region
is this line segment
0
500
1000
N

19. Max $160M_1 = 345M_2$

s:t:

M_1		$\le$	15
	M_2	$\le$	10
M_1		$\le$	5
	M_2	$\le$	5
$40M_1$	$+ 50M_2$	$\le$	1000

$M_1;M_2 \le 0$

b. $M_1 = 12.5$, $M_2 = 10$