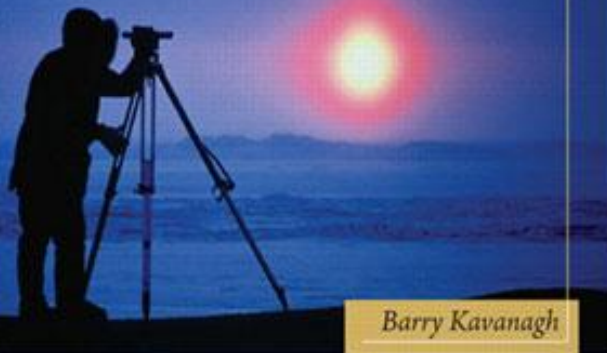


SOLUTIONS MANUAL


Eighth Edition

Surveying

Principles and Applications



Barry Kavanagh

 This work is protected by
US copyright laws and is for
instructors' use only.


Online Instructor's Manual
to accompany

Surveying Principles and Applications **Eighth Edition**

Barry F. Kavanagh



Upper Saddle River, New Jersey
Columbus, Ohio



This work is protected by United States copyright laws and is provided solely for the use of instructors in teaching their courses and assessing student learning. Dissemination or sale of any part of this work (including on the World Wide Web) will destroy the integrity of the work and is not permitted. The work and materials from it should never be made available to students except by instructors using the accompanying text in their classes. All recipients of this work are expected to abide by these restrictions and to honor the intended pedagogical purposes and the needs of other instructors who rely on these materials.

Copyright © 2009 by Pearson Education, Inc., Upper Saddle River, New Jersey 07458.

Pearson Prentice Hall. All rights reserved. Printed in the United States of America. This publication is protected by Copyright and permission should be obtained from the publisher prior to any prohibited reproduction, storage in a retrieval system, or transmission in any form or by any means, electronic, mechanical, photocopying, recording, or likewise. For information regarding permission(s), write to: Rights and Permissions Department.

Pearson Prentice Hall™ is a trademark of Pearson Education, Inc.

Pearson® is a registered trademark of Pearson plc

Prentice Hall® is a registered trademark of Pearson Education, Inc.

Instructors of classes using Barry F. Kavanagh's, *Surveying Principles and Applications, Eighth Edition*, may reproduce material from the instructor's manual for classroom use.

10 9 8 7 6 5 4 3 2 1



ISBN-13: 978-0-13-236513-0

ISBN-10: 0-13-236513-8

Preface

A publication of this type seems to always retain a few mistakes that have eluded detection through a number of checks. If you find any mistakes in the manual, please forward the information to me at [barry.kavanagh@cogeco.ca].

Any comments, corrections and/or suggestions about this Instructors' Manual or about the text *Surveying Principles and Applications*, 8th edition, will also be appreciated.

Barry Kavanagh,

CONTENTS

Section A: Text Problem Solutions

Chapter 2	Page 1
Chapter 3	Page 6
Chapter 4	Page 10
Chapter 7	Page 16
Chapter 9	Page 23
Chapter 11	Page 24
Chapter 13	Page 27
Chapter 14	Page 29
Chapter 15	Page 36
Chapter 16	Page 37
Chapter 17	Page 40

Section B: Typical Course Outlines, Project Descriptions and Tests

Typical Evaluation scheme	Page 44
Subject outline Surveying I	Page 45
Subject outline Surveying II	Page 46
Term assignments, Surveying I	Page 47
Term Assignment, Surveying II	Page 48
Sample Tests and Solutions	Page 49
Typical Class Handouts for Instrument and Software Use.	Page 59

SECTION A

SOLUTIONS TO TEXT PROBLEMS

CHAPTER 2

- 2.1 a) $(c+r) = 0.0206x (580/1000)^2 = 0.007$ ft.
 b) $(c+r) = 0.0206 \times (3)^2 = 0.185$ ft.
 c) $(c+r) = 0.0675 \times 0.25^2 = 0.004$ m.
 d) $(c+r) = 0.574 \times 1.8^2 = 1.86$ ft.
 e) $(c+r) = 0.0675 \times (2.5)^2 = 0.422$ m.
 f) $(c+r) = 0.0675 \times (2)^2 = 0.270$ m.

- 2.2 a) i 2.10 b) i 1.185 c) i 3.06 d) i 1.145
 ii 1.86 ii 1.150 ii 2.85 (2.84) ii 1.065
 iii 1.52 iii 1.040 iii 2.57 (2.56) iii 1.000
 iv 1.10 or 1.09 iv 1.000 iv 2.21 iv 0.935
 v 0.95 v 0.930 v 1.92 v 0.880

- 2.3 $5.50 = .574 K_1^2, K_1 = \sqrt{5.50/.574} = 3.095$ miles
 $168 = .574 K_2^2, K_2 = \sqrt{168/.574} = 17.108$ miles
 Maximum visibility distance = 20.20 miles

2.4	STATION	BS	HI	IS	FS	ELEVATION
	BM #50	1.27	532.76			531.49
	TP #1	2.33	530.18		4.91	527.85
	TP #2				6.17	524.01
		BS = 3.60			FS = 11.08	
	$531.49 + 3.60 = 535.09 - 11.08 = 524.01$ check					

2.5	STATION	BS	HI	IS	FS	ELEVATION
	BM #61	4.72	262.33			257.61
	0+00			4.42		257.91
	0+50			4.30		258.03
	TP #1	5.11	265.43		2.01	260.32
	1+00			4.66		260.77
	1+50			3.98		261.45
	1+75			1.20		264.23
	TP #2				1.80	263.63 E = - 0.002
		BS = 9.83			FS = 3.81	
	$257.61 + 9.83 = 267.44 - 3.81 = 263.63$ check					

2.6	STATION	BS	HI	FS	ELEVATION
	BM 100	2.71	357.94		355.23
	TP 1	3.62	356.68	4.88	353.06
	TP 2	3.51	356.22	3.97	352.71
	TP 3	3.17	356.68	2.81	353.41
	TP 4	1.47	356.43	1.62	354.96
	BM 100			1.21	355.22
		BS = 14.48		FS = 14.49	

$$355.23 + 14.48 - 14.49 = 355.22, \text{ check}$$

2.7 Error of closure = 0.01 ft.; for 1000 ft., second order (see Table 2.2) permits $.035 \sqrt{1000/5280} = 0.015$; therefore results qualify for **second order** accuracy.

2.8	STATION	BS	HI	IS	FS	ELEVATION
	BM 20	8.27	248.75			240.48
	TP 1	9.21	255.36		2.60	246.15
	0+00			11.3		244.1
	0+50			9.6		245.8
	0+61.48			8.71		246.65
	1+00			6.1		249.3
	TP 2	7.33	258.03		4.66	250.70
	1+50			5.8		252.2
	2+00			4.97		253.06
	BM 21				3.88	254.15

$$\text{BS} = 24.81 \quad \text{FS} = 11.14$$

$$240.48 + 24.81 - 11.14 = 254.15 \text{ Check}$$

2.9 Error of closure = 0.04 ft.; for 1000 ft., third order (see Table 2.2) permits $\pm 0.10 \sqrt{1000/5280} = 0.044$; therefore results qualify for **third order** accuracy.

2.10	STATION	BS	HI	IS	FS	ELEVATION
	BM 22	1.203	138.714			137.511
	<u>0+00</u>					
	CL			1.211		137.503
	10M LT., SL			1.430		137.284
	10M RT., SL			1.006		137.708
	<u>0+20</u>					
	10M LT., SL			2.93		135.78
	7.3M LT.			2.53		136.18
	4M LT.			2.301		136.413
	CL			2.381		136.333
	4M RT.			2.307		136.407
	7.8M RT.			2.41		136.30