

CONTENTS

CHAPTER 1 TRIGONOMETRIC FUNCTIONS	1
1-1 REVIEW OF MATHEMATICAL MODELS	4
1-4 MEASUREMENT OF ROTATION	7
1-3 DEFINITION OF THE TRIGONOMETRIC FUNCTIONS	11
1-4 APPROXIMATE VALUES OF TRIGONOMETRIC FUNCTIONS	17
1-5 RIGHT TRIANGLE PROBLEMS	23
1-6 CHAPTER REVIEW AND TEST	30
CHAPTER 2 APPLICATIONS OF TRIGONOMETRIC AND CIRCULAR FUNCTIONS	33
2-1 SINE AND COSINE GRAPHS	34
2-2 SINUSOIDS	35
2-3 SINUSOIDS—PHASE SHIFT AND VERTICAL SHIFT	37
2-4 GENERAL SINUSOIDAL GRAPHS	39
2-5 RADIAN MEASURE OF ANGLES	46
2-6 CIRCULAR FUNCTIONS	48
2-7 EVALUATION OF SINUSOIDAL FUNCTIONS	54
2-8 SINUSOIDAL FUNCTIONS AS MATHEMATICAL MODELS	58
2-9 COMPOSITION OF ORDINATES	73
2-10 GRAPHS OF TANGENT, COTANGENT, SECANT, AND COSECANT FUNCTIONS	77
2-11 ANGULAR VELOCITY	82
2-12 CHAPTER REVIEW AND TEST	90
CHAPTER 3 PROPERTIES OF TRIGONOMETRIC AND CIRCULAR FUNCTIONS	95
3-1 THREE PROPERTIES OF TRIGONOMETRIC FUNCTIONS	97
3-2 TRIGONOMETRIC IDENTITIES	102
3-3 PROPERTIES INVOLVING FUNCTIONS OF MORE THAN ONE ARGUMENT	108
3-4 MULTIPLE ARGUMENT PROPERTIES	118
3-5 HALF-ARGUMENT PROPERTIES	121
3-6 SUM AND PRODUCT PROPERTIES	126
3-7 LINEAR COMBINATION OF COSINE AND SINE WITH EQUAL ARGUMENTS	131
3-8 SIMPLIFICATION OF TRIGONOMETRIC EXPRESSIONS	133

3-9	TRIGONOMETRIC EQUATIONS	137
3-10	CHAPTER REVIEW AND TEST	144
CHAPTER 4 INVERSES OF TRIGONOMETRIC AND CIRCULAR FUNCTIONS		149
4-1	INVERSES OF FUNCTIONS	150
4-2	INTRODUCTION TO INVERSE CIRCULAR FUNCTIONS	152
4-3	INVERSE CIRCULAR FUNCTION GRAPHS	155
4-4	PROPERTIES OF INVERSE CIRCULAR AND TRIGONOMETRIC FUNCTIONS	161
4-5	REAL-WORLD APPLICATIONS OF INVERSE CIRCULAR FUNCTIONS	166
4-6	CHAPTER REVIEW AND TEST.	170
CHAPTER 5 TRIANGLE PROBLEMS		173
5-1	RIGHT TRIANGLE REVIEW.	174
5-2	OBLIQUE TRIANGLES—LAW OF COSINES	177
5-3	AREA OF A TRIANGLE	183
5-4	OBLIQUE TRIANGLES—LAW OF SINES	185
5-5	GENERAL SOLUTION OF TRIANGLES	192
5-6	VECTORS	196
5-7	REAL-WORLD TRIANGLE PROBLEMS	206
5-8	CHAPTER REVIEW AND TEST.	216
CHAPTER 6 MATHEMATICAL APPLICATIONS OF TRIGONOMETRIC AND CIRCULAR FUNCTIONS.		219
6-1	POLAR COORDINATES	220
6-2	POLAR EQUATIONS OF LINES AND CIRCLES	225
6-3	IMAGINARY NUMBERS	228
6-4	COMPLEX NUMBERS	232
6-5	COMPLEX NUMBERS IN POLAR FORM	236
6-6	COMPLEX NUMBERS FOR VECTORS.	242
6-7	INTRODUCTION TO POWER SERIES	246
6-8	TAYLOR SERIES FOR SINE, COSINE, AND EXPONENTIAL FUNCTIONS	249
6-9	CHAPTER REVIEW AND TEST.	256

FINAL EXAMINATION	260
TABLES	264
I SQUARES AND SQUARE ROOTS, CUBES AND CUBE ROOTS	264
II FOUR-PLACE LOGARITHMS OF NUMBERS	266
III TRIGONOMETRIC FUNCTIONS AND DEGREES-TO-RADIANS	268
IV CIRCULAR FUNCTIONS AND RADIANS TO DEGREES	273
GLOSSARY	276
GENERAL INDEX	278
INDEX OF PROBLEM TITLES	284
ANSWERS TO SELECTED PROBLEMS	285