DOCUMENT RESUME

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IDENTIFIERS	*Ohio Competency Analysis Profiles

ABSTRACT

This competency analysis profile contains eight lists of mathematics skills that have been identified by employers and verified by math-certified instructors as being core competencies for eight groups of occupational areas. Each list is organized into subsections dealing with the following: numbers and number relations, measurement, data analysis and probability, algebra, and geometry. The following are among the broad categories of occupations included in the eight occupational groups: business, marketing, and law enforcement; agriculture and horticulture; agricultural and auto mechanics; building trades; allied health occupations; home economics-related, food service, and hospitality occupations; commercial and graphic arts; and technical occupations and machine trades. Also included in this competency analysis profile are cross-reference charts illustrating the correlation between the identified competencies and the Onio Model Competency-Based Mathematics Program. A copy of the Ohio Model Competency-Based Mathematics Program concludes the profile. (MN)

OCAP

OHIO'S COMPETENCY ANALYSIS PROFILE

MATHEMATICS

This OCAP contains eight core mathematics lists that correspond to forty-nine occupational areas, which have been divided into eight groups. The core competencies have been identified by employers and verified by math-certified instructors. Also included in this OCAP are cross-reference charts that show the correlation between these competencies and the Ohio Model Competency-Based Mathematics Program.

Division of Vocational and Career Education
Ohio Department of Education

Vocational Instructional Materials Laboratory
Center on Education and Training for Employment
THE OHIO STATE UNIVERSITY

This OCAP is divided into eight lists that correspond to the following groups of occupational areas.

Group A

Accounting
Administrative/Secretarial Services
Business Administration and Management
Business Information Systems
Entertainment Marketing
General Marketing
Law Enforcement
Travel and Tourism Marketing

Group B

Agricultural Business Feed and Grain Worker
Agricultural Production
Agricultural Products Sales and Service Worker
Animal Management Technician
Fertilizer/Chemical Sales and Service Worker
Floriculture and Greenhouse Worker
Forest Industry Worker
Horticulture
Natural Resource
Nursery and Garden Center Worker
Resource Conservation
Turf and Landscape Worker

Group C

Agricultural/Industrial Mechanical Technician
Auto Collision Technician
Auto Mechanics
Diesel Mechanics
Power Equipment Technology

Group D

Building and Property Maintenance
Carpentry
Heating, Ventilation, Air-Conditioning, and Refrigeration
Masonry
Welding

Group E

Dental Assistant
Diversified Health Occupations
Medical Assistant
Nurse Aide
Practical Nursing

Group F

Clothing and Interiors, Production and Services
Cosmetology
Early Childhood Education and Care
Food Production, Management, and Services
Hospitality and Facility Care Services
Meat Processor

Group G

Commercial Art
Graphic Communications: Commercial Photography
Graphic Communications: Graphic Arts

Group H

Drafting
Electrical Trades
Electronics
Industrial Maintenance
Machine Trades

Ohio Competency Analysis Profile Mathematics

for

Accounting
Administrative/Secretarial Services
Business Administration and Management
Business Information Systems
Entertainment Marketing
General Marketing
Law Enforcement
Travel and Tourism Marketing

Unit 1: Numbers and Number Relations

Subunit 1.1: Group A

Competency	1.1.1:	Round and/or truncate numbers to designated place value
Competency	1.1.2:	Compute and solve problems involving integers, fractions, decimals, and percentages using order of operations
Competency	1.1.3:	Compare, order, and determine equivalence of real numbers (e.g., fractions, decimals, percentages)
Competency	1.1.4:	Estimate, apply, and solve problems involving fractions, decimals, percentages, and real numbers
Competency	1.1.5:	Set up, solve, and apply ratios and proportions
Competency	1.1.6:	Solve problems and make applications involving integers, fractions, decimals, percentages, ratios, and proportions
Competency	1.1.7:	Translate written and/or verbal statements into mathematical expressions
Competency	1.1.8:	Estimate answers

* Advancing
** Futuring

Unit 2: Measurement

Subunit 2.1: Group A

Competency 2.1.1: Convert, compare, and compute with common units of measurement within and/or across measurement systems

Competency 2.1.2: Compute using appropriate units of measurement

Competency 2.1.3: Read scale on measurement device(s) to nearest mark and make interpolations where appropriate

Competency 2.1.4: Estimate measurements

Unit 3: Data Analysis and Probability

Subunit 3.1: Group A

Competency 3.1.1: Interpret and use tables, charts, maps, and/or graphs

Competency 3.1.2: Identify patterns, note trends, and/or draw conclusions from tables, charts, maps, and/or graphs

Competency 3.1.3: Collect and organize data into tables, charts, and/or graphs

Competency 3.1.4: Compute and interpret mean, median, and/or mode

Competency 3.1.5: Use elementary notions of probability

Competency 3.1.6: Use problem-solving techniques

Unit 4: Algebra

Subunit 4.1: Group A

Competency 4.1.1: Evaluate and/or simplify algebraic expressions using simple substitutions

Competency 4.1.2: Solve linear equations

Competency 4.1.3: Use order of operations to solve problems

Competency 4.1.4: Use formulas

Competency 4.1.5: ***Compare and compute using scientific notation****

Competency 4.1.6: ***Use properties of exponents****

* Advancing
** Futuring

Unit 5: Geometry

Subunit 5.1: Group A

Competency 5.1.1: **Find perimeters and areas of geometric figures**

Competency 5.1.2: **Find surface areas and volumes of applicable geometric figures**

Competency 5.1.3: **Recognize, classify, and use properties of lines and angles**

Competency 5.1.4: **Recognize, classify, and use properties of two- and three-dimensional figures (e.g., circles, triangles, rectangles, cylinders)**

Competency 5.1.5: ***Apply Pythagorean theorem****

* Advancing
** Futuring

CROSS-REFERENCE CHART—GROUP A

Accounting
Administrative/Secretarial Services
Business Administration and Management
Business Information Systems
Entertainment Marketing
General Marketing
Law Enforcement
Travel and Tourism Marketing

Mathematics OCAP	Ohio Model Competency-Based Mathematics Program																																									
	PSS	NR1	NR2	NR3	NR4	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	E1	E2	E3	E4	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13	D14
UNIT 1: NUMBERS AND NUMBER RELATIONS																																										
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UNIT 2: MEASUREMENT																																										
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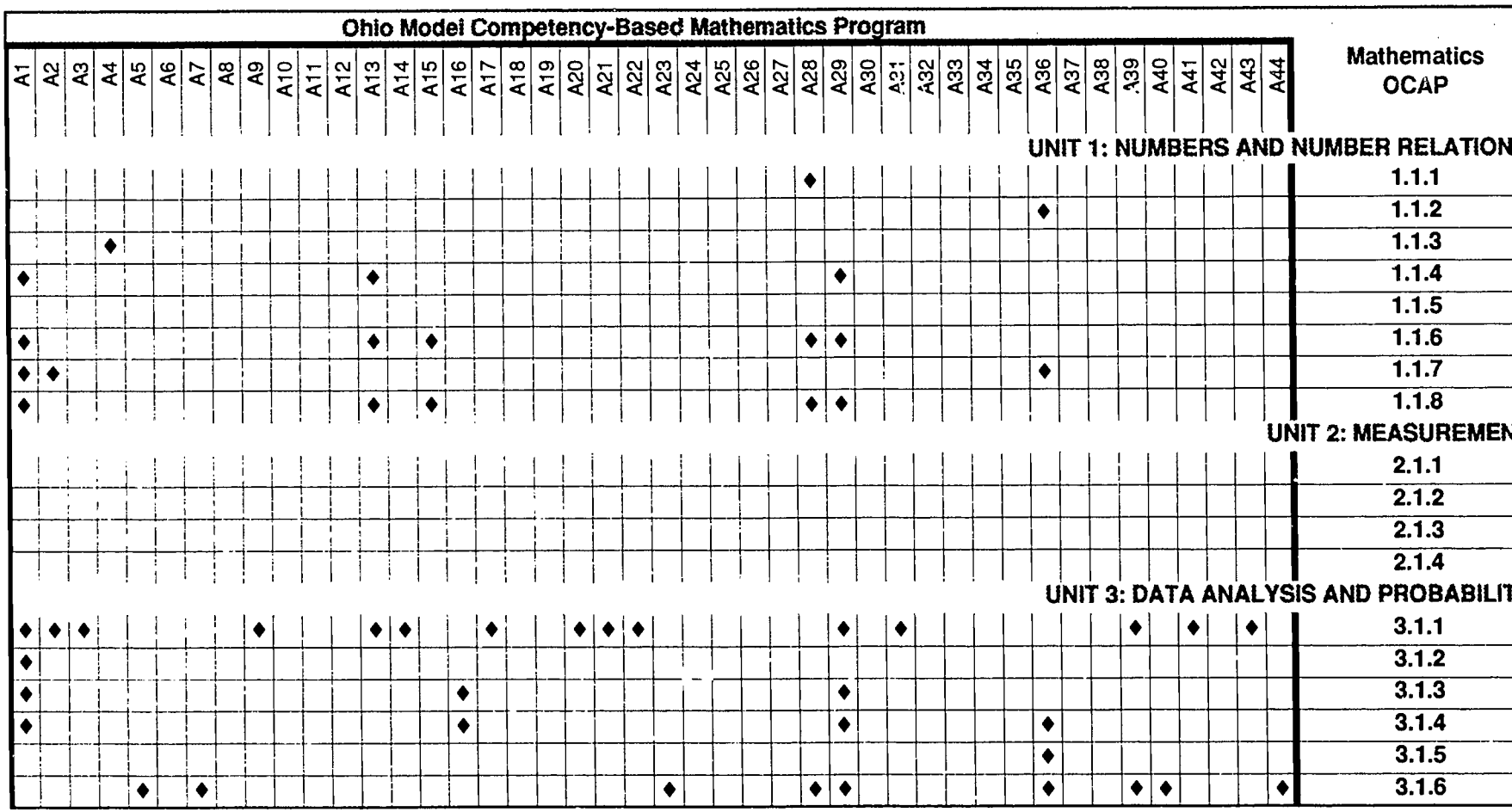
Refer to pages 78-81 for Ohio Model Competency-Based Mathematics Program codes.

CROSS-REFERENCE CHART—GROUP A

Accounting
Administrative/Secretarial Services
Business Administration and Management
Business Information Systems
Entertainment Marketing
General Marketing
Law Enforcement
Travel and Tourism Marketing



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Accounting
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Mathematics OCAP	Ohio Model Competency-Based Mathematics Program																																				
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CROSS-REFERENCE CHART—GROUP A

Accounting
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Ohio Model Competency-Based Mathematics Program																																										Mathematics OCAP
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Refer to pages 78-81 for Ohio Model Competency-Based Mathematics Program codes.

CROSS-REFERENCE CHART—GROUP A

Accounting
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Mathematics OCAP	Ohio Model Competency-Based Mathematics Program																																											
	G1	G2	G3	G4	G5	G6	G7	G8	G9	G10	G11	G12	G13	G14	G15	G16	G17	G18	G19	G20	G21	G22	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15	P16	P17	P18	P19	P20	P21	P22
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Refer to pages 78-81 for Ohio Model Competency-Based Mathematics Program codes.

CROSS-REFERENCE CHART—GROUP A

Accounting
Administrative/Secretarial Services
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Mathematics OCAP	Ohio Model Competency-Based Mathematics Program																																			
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Refer to pages 78-81 for Ohio Model Competency-Based Mathematics Program codes.

Ohio Competency Analysis Profile Mathematics

for

Agricultural Business Feed and Grain Worker
Agricultural Production
Agricultural Products Sales and Service Worker
Animal Management Technician
Fertilizer/Chemical Sales and Service Worker
Floriculture and Greenhouse Worker
Forest Industry Worker
Horticulture
Natural Resources
Nursery and Garden Center Worker
Resource Conservation
Turf and Landscape Worker

Unit 1: Numbers and Number Relations

Subunit 1.2: Group B

Competency	1.2.1:	Round and/or truncate numbers to designated place value
Competency	1.2.2:	Compute and solve problems involving integers, fractions, decimals, and percentages using order of operations
Competency	1.2.3:	Compare, order, and determine equivalence of real numbers (e.g., fractions, decimals, percentages)
Competency	1.2.4:	Estimate, apply, and solve problems involving fractions, decimals, percentages, and real numbers
Competency	1.2.5:	Set up, solve, and apply ratios and proportions
Competency	1.2.6:	Solve problems and make applications involving integers, fractions, decimals, percentages, ratios, and proportions
Competency	1.2.7:	Translate written and/or verbal statements into mathematical expressions
Competency	1.2.8:	Estimate answers

* Advancing
** Futuring

Unit 2: Measurement

Subunit 2.2: Group B

Competency	2.2.1:	Convert, compare, and compute with common units of measurement within and/or across measurement systems
Competency	2.2.2:	Compute using appropriate units of measurement
Competency	2.2.3:	Read scale on measurement device(s) to nearest mark and make interpolations where appropriate
Competency	2.2.4:	Estimate measurements

Unit 3: Data Analysis and Probability

Subunit 3.2: Group B

Competency	3.2.1:	Interpret and use tables, charts, maps, and/or graphs
Competency	3.2.2:	Identify patterns, note trends, and/or draw conclusions from tables, charts, maps, and/or graphs
Competency	3.2.3:	Collect and organize data into tables, charts, and/or graphs
Competency	3.2.4:	Compute and interpret mean, median, and/or mode
Competency	3.2.5:	Use elementary notions of probability
Competency	3.2.6:	Use problem-solving techniques

Unit 4: Algebra

Subunit 4.2: Group B

Competency	4.2.1:	Evaluate and/or simplify algebraic expressions using simple substitutions
Competency	4.2.2:	Solve linear equations
Competency	4.2.3:	Use order of operations to solve problems
Competency	4.2.4:	Use formulas
Competency	4.2.5:	Use properties of exponents
Competency	4.2.6:	Determine slope, midpoint, and distance

* Advancing
** Futuring

Unit 5: Geometry

Subunit 5.2: Group B

Competency 5.2.1: Find perimeters and areas of geometric figures

Competency 5.2.2: Find surface areas and volumes of applicable geometric figures

Competency 5.2.3: Recognize, classify, and use properties of lines and angles

Competency 5.2.4: Recognize, classify, and use properties of two- and three-dimensional figures (e.g., circles, triangles, rectangles, cylinders)

Competency 5.2.5: Apply problem solving to geometric figures

Competency 5.2.6: ***Apply Pythagorean theorem****

* Advancing
** Futuring

CROSS-REFERENCE CHART—GROUP B

Agricultural Business Feed and Grain Worker
Agricultural Production
Agricultural Products Sales and Service Worker
Animal Management Technician
Fertilizer/Chemical Sales and Service Worker
Floriculture and Greenhouse Worker

Forest Industry Worker
Horticulture
Natural Resources
Nursery and Garden Center Worker
Resource Conservation
Turf and Landscape Worker

Mathematics OCAP	Ohio Model Competency-Based Mathematics Program																																									
	PSS	NR1	NR2	NR3	NR4	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	E1	E2	E3	E4	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13	D14
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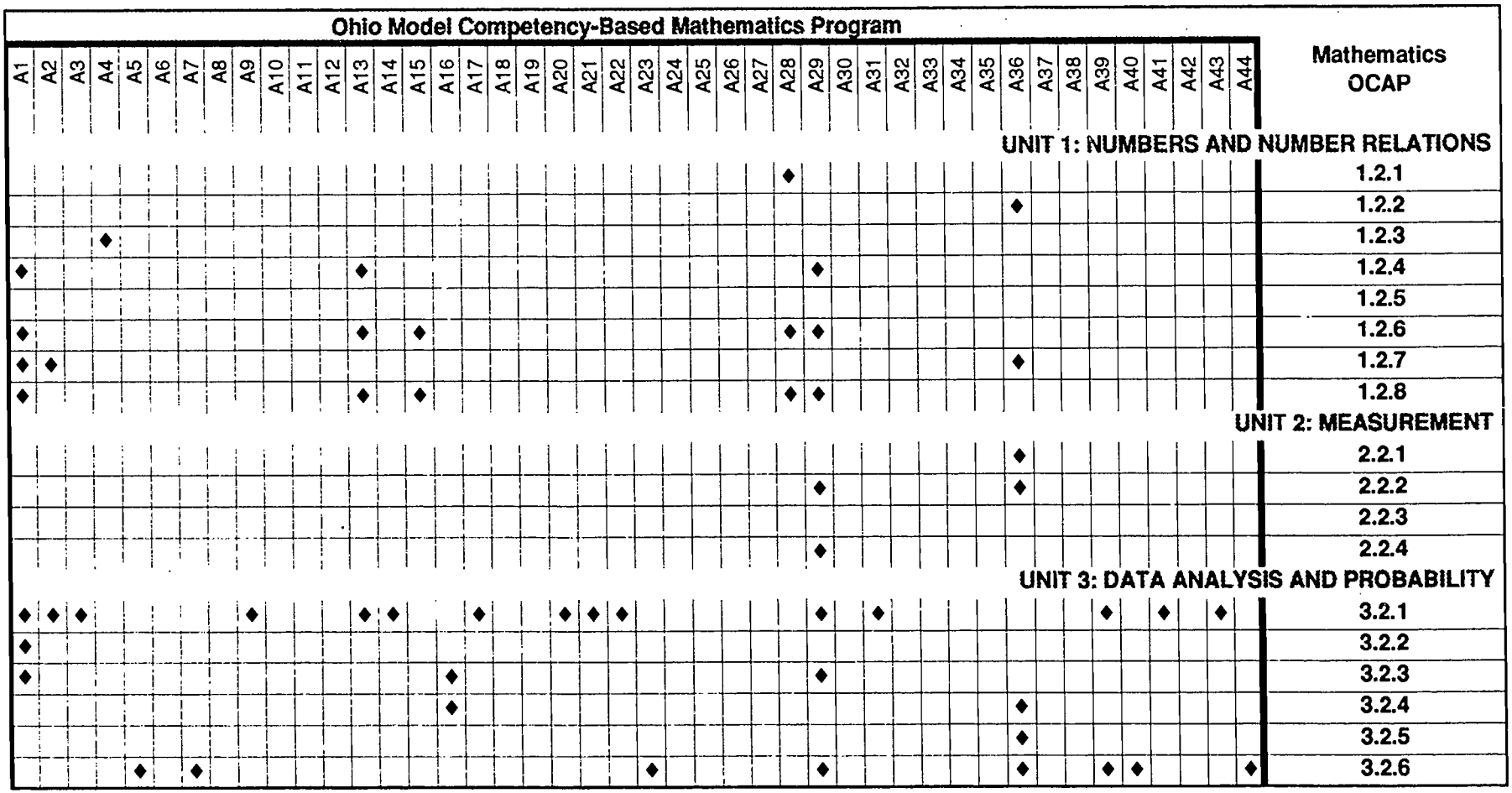
Refer to pages 78-81 for Ohio Model Competency-Based Mathematics Program codes.

Agricultural Business Feed and Grain Worker
Agricultural Production
Agricultural Products Sales and Service Worker
Animal Management Technician
Fertilizer/Chemical Sales and Service Worker
Floriculture and Greenhouse Worker
Forest Industry Worker
Horticulture
Natural Resources
Nursery and Garden Center Worker
Resource Conservation
Turf and Landscape Worker



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	PSS	NR1	NR2	NR3	NR4	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	E1	E2	E3	E4	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13	D14
UNIT 4: ALGEBRA																																									
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Refer to pages 78-81 for Ohio Model Competency-Based Mathematics Program codes.

Agricultural Business Feed and Grain Worker
Agricultural Production
Agricultural Products Sales and Service Worker
Animal Management Technician
Fertilizer/Chemical Sales and Service Worker
Floriculture and Greenhouse Worker
Forest Industry Worker
Horticulture
Natural Resources
Nursery and Garden Center Worker
Resource Conservation
Turf and Landscape Worker

Ohio Model Competency-Based Mathematics Program																																									Mathematics OCAP
A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	A18	A19	A20	A21	A22	A23	A24	A25	A26	A27	A28	A29	A30	A31	A32	A33	A34	A35	A36	A37	A38	A39	A40	A41	A42	A43	A44	
																																											UNIT 4: ALGEBRA
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		◆	◆					◆				◆		◆						◆								◆																**4.2.2**
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Refer to pages 78-81 for Ohio Model Competency-Based Mathematics Program codes.

CROSS-REFERENCE CHART—GROUP B

Agricultural Business Feed and Grain Worker
Agricultural Production
Agricultural Products Sales and Service Worker
Animal Management Technician
Fertilizer/Chemical Sales and Service Worker
Floriculture and Greenhouse Worker

Forest Industry Worker
Horticulture
Natural Resources
Nursery and Garden Center Worker
Resource Conservation
Turf and Landscape Worker

Ohio Model Competency-Based Mathematics Program

Mathematics OCAP	G1	G2	G3	G4	G5	G6	G7	G8	G9	G10	G11	G12	G13	G14	G15	G16	G17	G18	G19	G20	G21	G22
UNIT 1: NUMBERS AND NUMBER RELATIONS																						
1.2.1																						
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1.2.8	◆		◆	◆															◆			
UNIT 2: MEASUREMENT																						
2.2.1																						
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2.2.3																						
2.2.4																						
UNIT 3: DATA ANALYSIS AND PROBABILITY																						
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3.2.6					◆			◆	◆		◆	◆	◆	◆	◆		◆	◆		◆	◆	

Mathematics OCAP	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15	P16	P17	P18	P19	P20	P21	P22
UNIT 1: NUMBERS AND NUMBER RELATIONS																						
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UNIT 2: MEASUREMENT																						
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2.2.4																						
UNIT 3: DATA ANALYSIS AND PROBABILITY																						
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3.2.6	◆					◆		◆		◆								◆				

Refer to pages 78-81 for Ohio Model Competency-Based Mathematics Program codes.

CROSS-REFERENCE CHART—GROUP B

Agricultural Business Feed and Grain Worker
Agricultural Production
Agricultural Products Sales and Service Worker
Animal Management Technician
Fertilizer/Chemical Sales and Service Worker
Floriculture and Greenhouse Worker
Forest Industry Worker
Horticulture
Natural Resources
Nursery and Garden Center Worker
Resource Conservation
Turf and Landscape Worker

Ohio Model Competency-Based Mathematics Program

Mathematics OCAP	G1	G2	G3	G4	G5	G6	G7	G8	G9	G10	G11	G12	G13	G14	G15	G16	G17	G18	G19	G20	G21	G22
UNIT 4: ALGEBRA																						
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4.2.5																						
4.2.6									◆													
UNIT 5: GEOMETRY																						
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5.2.4					◆																	
5.2.5																		◆				
5.2.6			◆																			

Mathematics OCAP	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15	P16	P17	P18	P19	P20	P21	P22
UNIT 4: ALGEBRA																						
4.2.1	◆		◆			◆												◆				
4.2.2		◆				◆												◆				
4.2.3	◆		◆	◆		◆												◆				
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4.2.5	◆		◆			◆												◆				
4.2.6						◆					◆							◆				
UNIT 5: GEOMETRY																						
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5.2.4																						
5.2.5																						
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Refer to pages 78-81 for Ohio Model Competency-Based Mathematics Program codes.

Ohio Competency Analysis Profile Mathematics

for

Agricultural/Industrial Mechanical Technician
Auto Collision Technician
Auto Mechanics
Diesel Mechanics
Power Equipment Technology

Unit 1: Numbers and Number Relations

Subunit 1.3: Group C

Competency	1.3.1:	Round and/or truncate numbers to designated place value
Competency	1.3.2:	Compute and solve problems involving integers, fractions, decimals, and percentages using order of operations
Competency	1.3.3:	Compare, order, and determine equivalence of real numbers (e.g., fractions, decimals, percentages)
Competency	1.3.4:	Estimate, apply, and solve problems involving fractions, decimals, percentages, and real numbers
Competency	1.3.5:	Set up, solve, and apply ratios and proportions
Competency	1.3.6:	Solve problems and make applications involving integers, fractions, decimals, percentages, ratios, and proportions
Competency	1.3.7:	Translate written and/or verbal statements into mathematical expressions
Competency	1.3.8:	Estimate answers

* Advancing
** Futuring

Unit 2: Measurement

Subunit 2.3: Group C

Competency	2.3.1:	Convert, compare, and compute with common units of measurement within and/or across measurement systems
Competency	2.3.2:	Compute using appropriate units of measurement
Competency	2.3.3:	Read scale on measurement device(s) to nearest mark and make interpolations where appropriate
Competency	2.3.4:	Estimate measurements

Unit 3: Data Analysis and Probability

Subunit 3.3: Group C

Competency	3.3.1:	Interpret and use tables, charts, maps, and/or graphs
Competency	3.3.2:	Identify patterns, note trends, and/or draw conclusions from tables, charts, maps, and/or graphs
Competency	3.3.3:	Collect and organize data into tables, charts, and/or graphs
Competency	3.3.4:	Compute and interpret mean, median, and/or mode
Competency	3.3.5:	Use elementary notions of probability
Competency	3.3.6:	Use problem-solving techniques

Unit 4: Algebra

Subunit 4.3: Group C

Competency	4.3.1:	Evaluate and/or simplify algebraic expressions using simple substitutions
Competency	4.3.2:	Solve linear equations
Competency	4.3.3:	Use order of operations to solve problems
Competency	4.3.4:	Use formulas
Competency	*4.3.5:*	*Determine slope, midpoint, and distance**
Competency	*4.3.6:*	*Graph linear functions**

* Advancing
** Futuring

Unit 5: Geometry

Subunit 5.3: Group C

Competency 5.3.1: **Find perimeters and areas of geometric figures**

Competency 5.3.2: **Find surface areas and volumes of applicable geometric figures**

Competency 5.3.3: **Recognize, classify, and use properties of lines and angles**

Competency 5.3.4: **Recognize, classify, and use properties of two- and three-dimensional figures (e.g., circles, triangles, rectangles, cylinders)**

Competency 5.3.5: ***Apply Pythagorean theorem****

Competency 5.3.6: ***Describe and apply properties of similar and/or congruent figures****

* Advancing
** Futuring

Agricultural/Industrial Mechanical Technician
Auto Collision Technician
Auto Mechanics
Diesel Mechanics
Power Equipment Technology

Mathematics OCAP	Ohio Model Competency-Based Mathematics Program																																							
	PSS	NR1	NR2	NR3	NR4	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	E1	E2	E3	E4	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13	D14
UNIT 1: NUMBERS AND NUMBER RELATIONS																																									
1.3.1	◆	◆	◆			◆	◆																		◆	◆		◆														
1.3.2	◆		◆			◆	◆	◆	◆	◆	◆	◆		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆		◆	◆																
1.3.3	◆	◆	◆	◆		◆	◆																																			
1.3.4	◆		◆			◆	◆												◆			◆			◆	◆		◆														
1.3.5	◆													◆																												
1.3.6	◆	◆	◆	◆		◆	◆					◆		◆	◆		◆		◆			◆	◆		◆	◆		◆						◆								
1.3.7	◆						◆															◆																				
1.3.8	◆	◆	◆	◆		◆	◆					◆		◆	◆		◆		◆			◆	◆					◆						◆								
UNIT 2: MEASUREMENT																																									
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2.3.2	◆		◆			◆	◆	◆	◆		◆	◆		◆		◆	◆						◆	◆																		
2.3.3	◆					◆	◆	◆			◆	◆		◆									◆	◆																		
2.3.4	◆		◆			◆	◆	◆	◆		◆	◆		◆		◆	◆						◆	◆		◆		◆														
UNIT 3: DATA ANALYSIS AND PROBABILITY																																									
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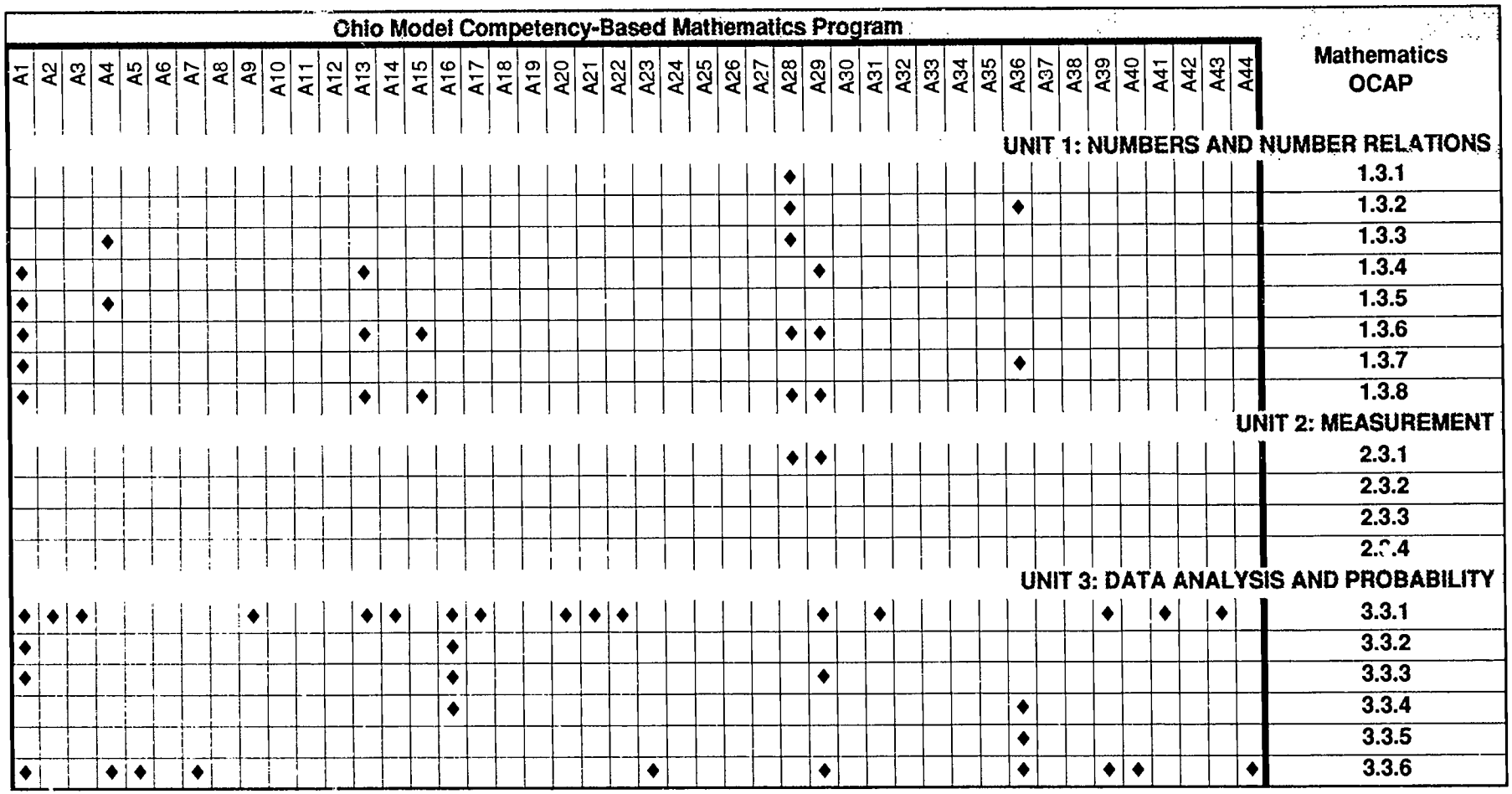
3.3.3	◆														◆	◆		◆	◆	◆									◆			◆				◆	◆			◆	
3.3.4	◆	◆	◆			◆																								◆				◆			◆	◆				
3.3.5	◆	◆												◆																	◆	◆			◆	◆	◆				
3.3.6	◆		◆			◆		◆	◆	◆	◆	◆	◆		◆	◆	◆		◆	◆	◆	◆		◆	◆	◆		◆				◆									

Refer to pages 78-81 for Ohio Model Competency-Based Mathematics Program codes.

Agricultural/Industrial Mechanical Technician
Auto Collision Technician
Auto Mechanics
Diesel Mechanics
Power Equipment Technology



Refer to pages 78-81 for Ohio Model Competency-Based Mathematics Program codes.

CROSS-REFERENCE CHART—GROUP C

Agricultural/Industrial Mechanical Technician
Auto Collision Technician
Auto Mechanics
Diesel Mechanics
Power Equipment Technology

Mathematics OCAP	Ohio Model Competency-Based Mathematics Program																																									
	PSS	NR1	NR2	NR3	NR4	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	E1	E2	E3	E4	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13	D14
UNIT 4: ALGEBRA																																										
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4.3.4	◆		◆			◆		◆	◆	◆	◆	◆		◆		◆	◆					◆		◆		◆		◆				◆				◆						
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UNIT 5: GEOMETRY																																										
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Refer to pages 78-81 for Ohio Model Competency-Based Mathematics Program codes.

CROSS-REFERENCE CHART—GROUP C

Agricultural/Industrial Mechanical Technician
Auto Collision Technician
Auto Mechanics
Diesel Mechanics
Power Equipment Technology

Ohio Model Competency-Based Mathematics Program

Mathematics OCAP	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	A18	A19	A20	A21	A22
UNIT 4: ALGEBRA																						
4.3.1	◆	◆											◆									
4.3.2				◆					◆				◆									◆
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4.3.5*									◆				◆								◆	
4.3.6*		◆	◆		◆				◆				◆								◆	
UNIT 5: GEOMETRY																						
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5.3.5*																						
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Mathematics OCAP	A23	A24	A25	A26	A27	A28	A29	A30	A31	A32	A33	A34	A35	A36	A37	A38	A39	A40	A41	A42	A43	A44
UNIT 4: ALGEBRA																						
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UNIT 5: GEOMETRY																						
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Refer to pages 78-81 for Ohio Model Competency-Based Mathematics Program codes.

Agricultural/Industrial Mechanical Technician
Auto Collision Technician
Auto Mechanics
Diesel Mechanics
Power Equipment Technology

Mathematics OCAP	Ohio Model Competency-Based Mathematics Program																																						
	G1	G2	G3	G4	G5	G6	G7	G8	G9	G10	G11	G12	G13	G14	G15	G16	G17	G18	G19	G20	G21	G22	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15	P16	P17	P18	P19	P20	P21	P22
UNIT 1: NUMBERS AND NUMBER RELATIONS																																											
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UNIT 2: MEASUREMENT																																												
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UNIT 3: DATA ANALYSIS AND PROBABILITY																																												
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Refer to pages 78-81 for Ohio Model Competency-Based Mathematics Program codes.

Agricultural/Industrial Mechanical Technician
Auto Collision Technician
Auto Mechanics
Diesel Mechanics
Power Equipment Technology

Mathematics OCAP	Ohio Model Competency-Based Mathematics Program																																			
	G1	G2	G3	G4	G5	G6	G7	G8	G9	G10	G11	G12	G13	G14	G15	G16	G17	G18	G19	G20	G21	G22	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15	P16	P17	P18	P19	P20	P21	P22
UNIT 4: ALGEBRA																																											
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UNIT 5: GEOMETRY																																											
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5.3.4	◆	◆		◆	◆					◆								◆																										
5.3.5*		◆	◆															◆																										
5.3.6*		◆		◆														◆																										

Refer to pages 78-81 for Ohio Model Competency-Based Mathematics Program codes.

Ohio Competency Analysis Profile Mathematics

for

Building and Property Maintenance
Carpentry
Heating, Ventilation, Air-Conditioning, and Refrigeration
Masonry
Welding

Unit 1: Numbers and Number Relations

Subunit 1.4: Group D

Competency	1.4.1:	Round and/or truncate numbers to designated place value
Competency	1.4.2:	Compute and solve problems involving integers, fractions, decimals, and percentages using order of operations
Competency	1.4.3:	Compare, order, and determine equivalence of real numbers (e.g., fractions, decimals, percentages)
Competency	1.4.4:	Estimate, apply, and solve problems involving fractions, decimals, percentages, and real numbers
Competency	1.4.5:	Set up, solve, and apply ratios and proportions
Competency	1.4.6:	Solve problems and make applications involving integers, fractions, decimals, percentages, ratios, and proportions
Competency	1.4.7:	Translate written and/or verbal statements into mathematical expressions
Competency	1.4.8:	Estimate answers

Unit 2: Measurement

Subunit 2.4: Group D

Competency	2.4.1:	Convert, compare, and compute with common units of measurement within and/or across measurement systems
Competency	2.4.2:	Compute using appropriate units of measurement
Competency	2.4.3:	Read scale on measurement device(s) to nearest mark and make interpolations where appropriate
Competency	2.4.4:	Estimate measurements

Unit 3: Data Analysis and Probability

Subunit 3.4: Group D

Competency	3.4.1:	Interpret and use tables, charts, maps, and/or graphs
Competency	3.4.2:	Identify patterns, note trends, and/or draw conclusions from tables, charts, maps, and/or graphs
Competency	3.4.3:	Collect and organize data into tables, charts, and/or graphs
Competency	3.4.4:	Compute and interpret mean, median, and/or mode
Competency	3.4.5:	Use elementary notions of probability
Competency	3.4.6:	Use problem-solving techniques

Unit 4: Algebra

Subunit 4.4: Group D

Competency	4.4.1:	Evaluate and/or simplify algebraic expressions using simple substitutions
Competency	4.4.2:	Solve linear equations
Competency	4.4.3:	Use order of operations to solve problems
Competency	4.4.4:	Use formulas

Unit 5: Geometry

Subunit 5.4: Group D

Competency 5.4.1: Find perimeters and areas of geometric figures

Competency 5.4.2: Find surface areas and volumes of applicable geometric figures

Competency 5.4.3: Recognize, classify, and use properties of lines and angles

Competency 5.4.4: Recognize, classify, and use properties of two- and three-dimensional figures (e.g., circles, triangles, rectangles, cylinders)

Competency 5.4.5: Apply problem solving to geometric figures

Competency 5.4.6: Apply Pythagorean theorem

* Advancing
** Futuring

Building and Property Maintenance
Carpentry
Heating, Ventilation, Air-Conditioning, and Refrigeration
Masonry
Welding

Mathematics OCAP	Ohio Model Competency-Based Mathematics Program																																									
	PSS	NR1	NR2	NR3	NR4	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	E1	E2	E3	E4	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13	D14
UNIT 1: NUMBERS AND NUMBER RELATIONS																																										
1.4.1	◆	◆	◆			◆	◆					◆		◆	◆		◆		◆			◆	◆	◆	◆	◆		◆							◆							
1.4.2	◆	◆	◆	◆		◆	◆	◆	◆	◆	◆	◆		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆		◆							◆							
1.4.3	◆	◆	◆	◆		◆	◆					◆		◆	◆		◆		◆			◆	◆	◆		◆		◆							◆							
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UNIT 3: DATA ANALYSIS AND PROBABILITY																																										
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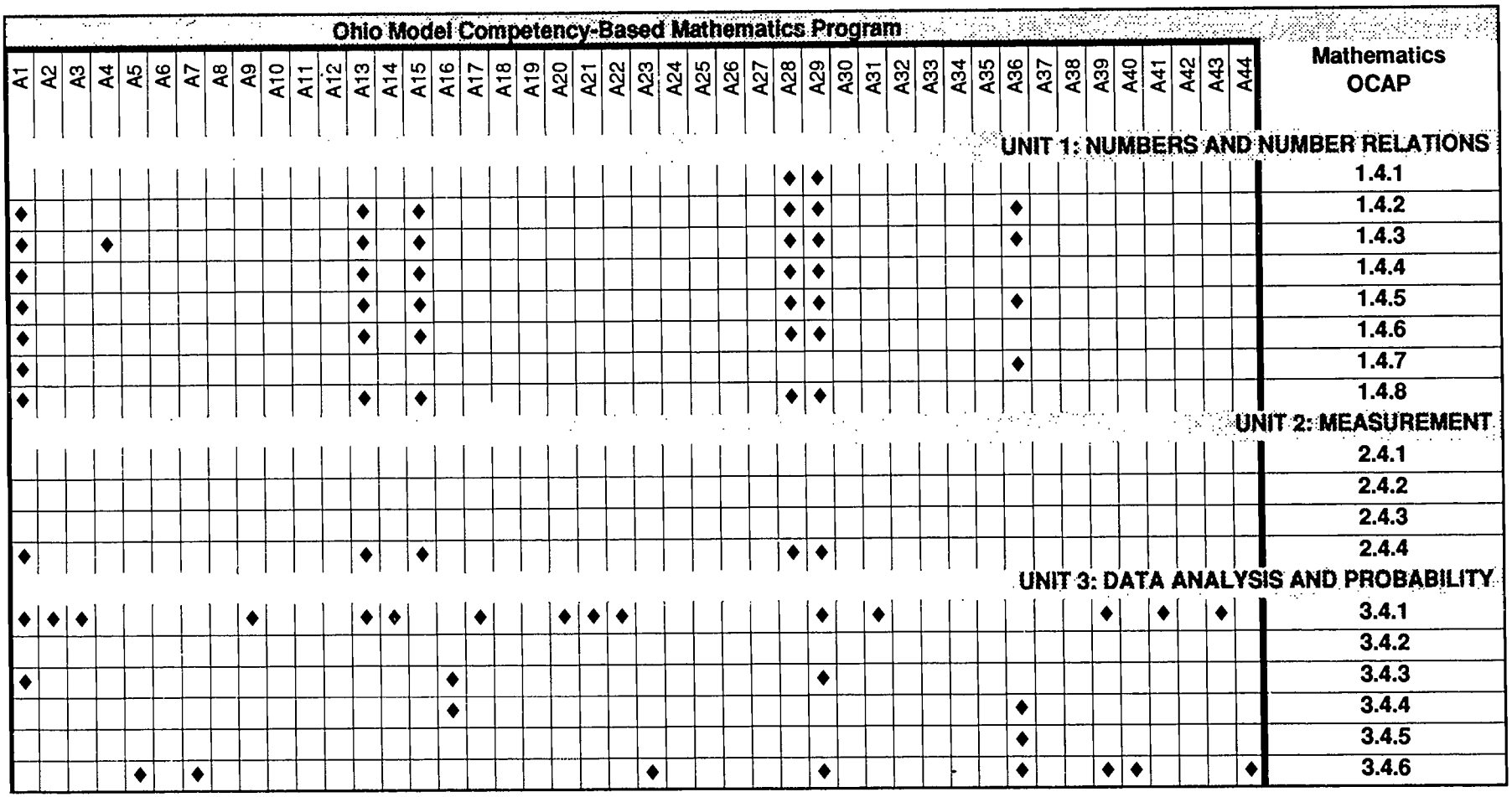
Refer to pages 78-81 for Ohio Model Competency-Based Mathematics Program codes.

Building and Property Maintenance
Carpentry
Heating, Ventilation, Air-Conditioning, and Refrigeration
Masonry
Welding



Refer to pages 78-81 for Ohio Model Competency-Based Mathematics Program codes.

Building and Property Maintenance
Carpentry
Heating, Ventilation, Air-Conditioning, and Refrigeration
Masonry
Welding

Mathematics OCAP	Ohio Model Competency-Based Mathematics Program																																						
	PSS	NR1	NR2	NR3	NR4	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	E1	E2	E3	E4	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13	D14
UNIT 4: ALGEBRA																																									
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Refer to pages 78-81 for Ohio Model Competency-Based Mathematics Program codes.

CROSS-REFERENCE CHART—GROUP D

Building and Property Maintenance
Carpentry
Heating, Ventilation, Air-Conditioning, and Refrigeration
Masonry
Welding

Ohio Model Competency-Based Mathematics Program

Mathematics OCAP	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	A18	A19	A20	A21	A22
UNIT 4: ALGEBRA																						
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Mathematics OCAP	A23	A24	A25	A26	A27	A28	A29	A30	A31	A32	A33	A34	A35	A36	A37	A38	A39	A40	A41	A42	A43	A44
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Refer to pages 78-81 for Ohio Model Competency-Based Mathematics Program codes.

CROSS-REFERENCE CHART—GROUP D

Building and Property Maintenance
Carpentry
Heating, Ventilation, Air-Conditioning, and Refrigeration
Masonry
Welding

Mathematics OCAP	Ohio Model Competency-Based Mathematics Program																																											
	G1	G2	G3	G4	G5	G6	G7	G8	G9	G10	G11	G12	G13	G14	G15	G16	G17	G18	G19	G20	G21	G22	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15	P16	P17	P18	P19	P20	P21	P22
UNIT 1: NUMBERS AND NUMBER RELATIONS																																												
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Refer to pages 78-81 for Ohio Model Competency-Based Mathematics Program codes.

Building and Property Maintenance
Carpentry
Heating, Ventilation, Air-Conditioning, and Refrigeration
Masonry
Welding

Mathematics OCAP	Ohio Model Competency-Based Mathematics Program																																							
	G1	G2	G3	G4	G5	G6	G7	G8	G9	G10	G11	G12	G13	G14	G15	G16	G17	G18	G19	G20	G21	G22	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15	P16	P17	P18	P19	P20	P21	P22
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Refer to pages 78-81 for Ohio Model Competency-Based Mathematics Program codes.

Ohio Competency Analysis Profile Mathematics

for

Dental Assistant
Diversified Health Occupations
Medical Assistant
Nurse Aide
Practical Nursing

Unit 1: Numbers and Number Relations

Subunit 1.5: Group E

Competency	1.5.1:	Round and/or truncate numbers to designated place value
Competency	1.5.2:	Compute and solve problems involving integers, fractions, decimals, and percentages using order of operations
Competency	1.5.3:	Compare, order, and determine equivalence of real numbers (e.g., fractions, decimals, percentages)
Competency	1.5.4:	Estimate, apply, and solve problems involving fractions, decimals, percentages, and real numbers
Competency	1.5.5:	Set up, solve, and apply ratios and proportions
Competency	1.5.6:	Solve problems and make applications involving integers, fractions, decimals, percentages, ratios, and proportions
Competency	1.5.7:	Translate written and/or verbal statements into mathematical expressions
Competency	1.5.8:	Estimate answers
Competency	1.5.9:	Convert between Arabic and Roman numerals
Competency	1.5.10:	Set up problems involving rational numbers

* Advancing
** Futuring

Unit 2: Measurement

Subunit 2.5: Group E

Competency	2.5.1:	Convert, compare, and compute with common units of measurement within and/or across measurement systems
Competency	2.5.2:	Compute using appropriate units of measurement
Competency	2.5.3:	Read scale on measurement device(s) to nearest mark and make interpolations where appropriate
Competency	2.5.4:	Estimate measurements

Unit 3: Data Analysis and Probability

Subunit 3.5: Group E

Competency	3.5.1:	Interpret and use tables, charts, maps, and/or graphs
Competency	3.5.2:	Identify patterns, note trends, and/or draw conclusions from tables, charts, maps, and/or graphs
Competency	3.5.3:	Collect and organize data into tables, charts, and/or graphs
Competency	3.5.4:	Compute and interpret mean, median, and/or mode
Competency	3.5.5:	Use elementary notions of probability
Competency	3.5.6:	Use problem-solving techniques

Unit 4: Algebra

Subunit 4.5: Group E

Competency	4.5.1:	Evaluate and/or simplify algebraic expressions using simple substitutions
Competency	4.5.2:	Solve linear equations
Competency	4.5.3:	Use order of operations to solve problems
Competency	4.5.4:	Use formulas

* Advancing
** Futuring

Unit 5: Geometry

Subunit 5.5: Group E

Competency 5.5.1: Find perimeters and areas of geometric figures

Competency 5.5.2: Find surface areas and volumes of applicable geometric figures

Competency 5.5.3: Recognize, classify, and use properties of lines and angles

Competency 5.5.4: Recognize, classify, and use properties of two- and three-dimensional figures (e.g., circles, triangles, rectangles, cylinders)

CROSS-REFERENCE CHART—GROUP E

Dental Assistant
Diversified Health Occupations
Medical Assistant
Nurse Aide
Practical Nursing

Mathematics OCAP	Ohio Model Competency-Based Mathematics Program																																									
	PSS	NR1	NR2	NR3	NR4	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	E1	E2	E3	E4	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13	D14
UNIT 1: NUMBERS AND NUMBER RELATIONS																																										
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UNIT 3: DATA ANALYSIS AND PROBABILITY																																										
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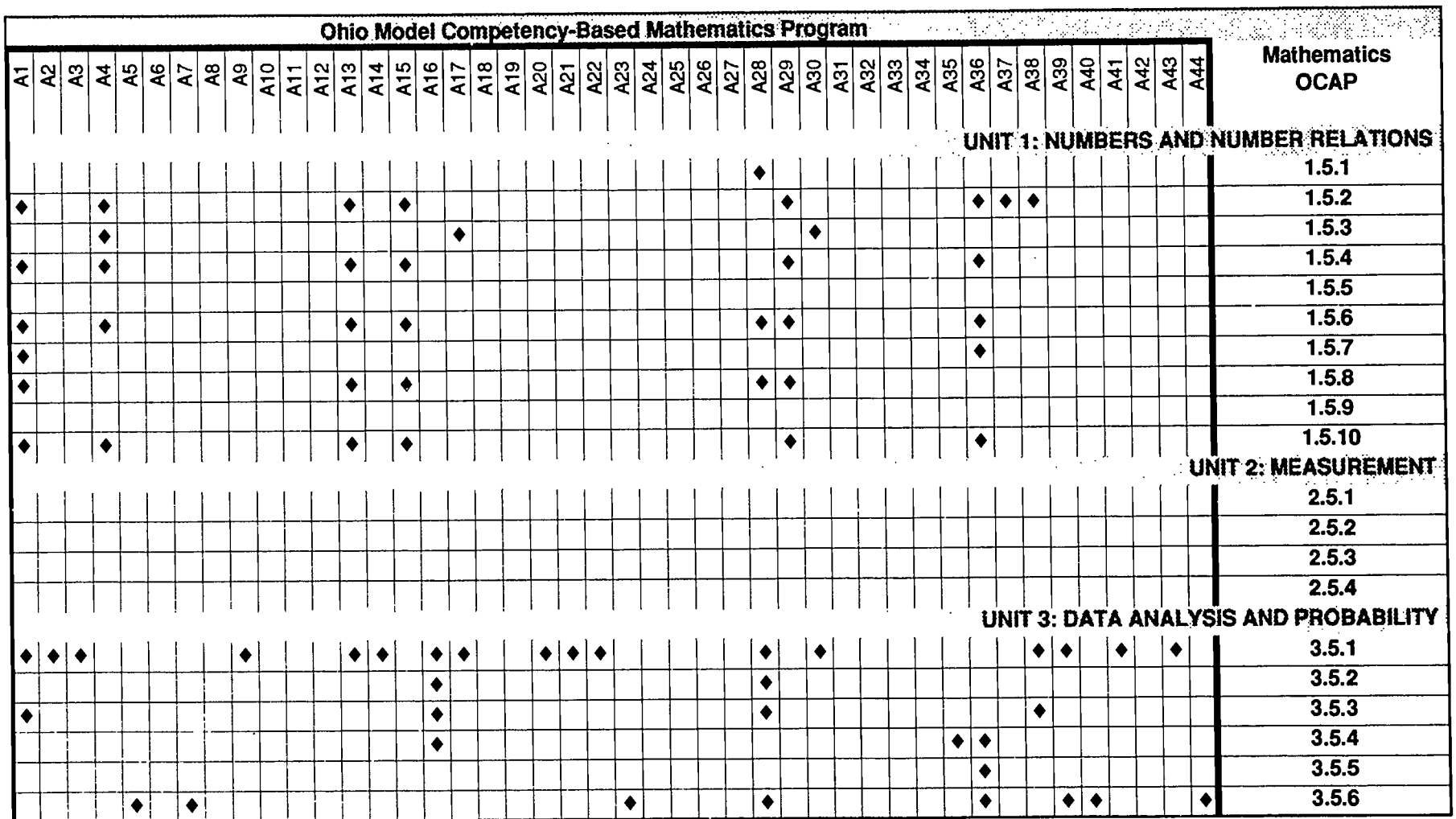
Refer to pages 78-81 for Ohio Model Competency-Based Mathematics Program codes.

Dental Assistant
Diversified Health Occupations
Medical Assistant
Nurse Aide
Practical Nursing



Refer to pages 78-81 for Ohio Model Competency-Based Mathematics Program codes.

CROSS-REFERENCE CHART—GROUP E

Dental Assistant
Diversified Health Occupations
Medical Assistant
Nurse Aide
Practical Nursing

Mathematics OCAP	Ohio Model Competency-Based Mathematics Program																																									
	PSS	NR1	NR2	NR3	NR4	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	E1	E2	E3	E4	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13	D14
UNIT 4: ALGEBRA																																										
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UNIT 5: GEOMETRY																																										
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Refer to pages 78-81 for Ohio Model Competency-Based Mathematics Program codes.

CROSS-REFERENCE CHART—GROUP E

Dental Assistant
Diversified Health Occupations
Medical Assistant
Nurse Aide
Practical Nursing

Ohio Model Competency-Based Mathematics Program																																										Mathematics OCAP
A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	A18	A19	A20	A21	A22	A23	A24	A25	A26	A27	A28	A29	A30	A31	A32	A33	A34	A35	A36	A37	A38	A39	A40	A41	A42	A43	A44	
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Refer to pages 78-81 for Ohio Model Competency-Based Mathematics Program codes.

CROSS-REFERENCE CHART—GROUP E

Dental Assistant
Diversified Health Occupations
Medical Assistant
Nurse Aide
Practical Nursing

Mathematics OCAP	Ohio Model Competency-Based Mathematics Program																																							
	G1	G2	G3	G4	G5	G6	G7	G8	G9	G10	G11	G12	G13	G14	G15	G16	G17	G18	G19	G20	G21	G22	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15	P16	P17	P18	P19	P20	P21	P22
UNIT 1: NUMBERS AND NUMBER RELATIONS																																										
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Refer to pages 78-81 for Ohio Model Competency-Based Mathematics Program codes.

Dental Assistant
Diversified Health Occupations
Medical Assistant
Nurse Aide
Practical Nursing

Mathematics OCAP	Ohio Model Competency-Based Mathematics Program																																							
	G1	G2	G3	G4	G5	G6	G7	G8	G9	G10	G11	G12	G13	G14	G15	G16	G17	G18	G19	G20	G21	G22	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15	P16	P17	P18	P19	P20	P21	P22
UNIT 4: ALGEBRA																																											
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Refer to pages 78-81 for Ohio Model Competency-Based Mathematics Program codes.

Ohio Competency Analysis Profile Mathematics

for

Clothing and Interiors, Production and Services
Cosmetology
Early Childhood Education and Care
Food Production, Management, and Services
Hospitality and Facility Care Services
Meat Processor

Unit 1: Numbers and Number Relations

Subunit 1.6: Group F

Competency	1.6.1:	Round and/or truncate numbers to designated place value
Competency	1.6.2:	Compute and solve problems involving integers, fractions, decimals, and percentages using order of operations
Competency	1.6.3:	Compare, order, and determine equivalence of real numbers (e.g., fractions, decimals, percentages)
Competency	1.6.4:	Estimate, apply, and solve problems involving fractions, decimals, percentages, and real numbers
Competency	1.6.5:	Set up, solve, and apply ratios and proportions
Competency	1.6.6:	Solve problems and make applications involving integers, fractions, decimals, percentages, ratios, and proportions
Competency	1.6.7:	Translate written and/or verbal statements into mathematical expressions
Competency	1.6.8:	Estimate answers

Unit 2: Measurement

Subunit 2.6: Group F

Competency 2.6.1:	Convert, compare, and compute with common units of measurement within and/or across measurement systems
Competency 2.6.2:	Compute using appropriate units of measurement
Competency 2.6.3:	Read scale on measurement device(s) to nearest mark and make interpolations where appropriate
Competency 2.6.4:	Estimate measurements

Unit 3: Data Analysis and Probability

Subunit 3.6: Group F

Competency 3.6.1:	Interpret and use tables, charts, maps, and/or graphs
Competency 3.6.2:	Identify patterns, note trends, and/or draw conclusions from tables, charts, maps, and/or graphs
Competency 3.6.3:	Collect and organize data into tables, charts, and/or graphs
Competency 3.6.4:	Compute and interpret mean, median, and/or mode
Competency 3.6.5:	Use elementary notions of probability
Competency 3.6.6:	Use problem-solving techniques

Unit 4: Algebra

Subunit 4.6: Group F

Competency 4.6.1:	Evaluate and/or simplify algebraic expressions using simple substitutions
Competency 4.6.2:	Solve linear equations
Competency 4.6.3:	Use order of operations to solve problems
Competency 4.6.4:	Use formulas

* Advancing
** Futuring

Unit 5: Geometry

Subunit 5.6: Group F

Competency 5.6.1: Find perimeters and areas of geometric figures

Competency 5.6.2: Find surface areas and volumes of applicable geometric figures

Competency 5.6.3: Recognize, classify, and use properties of lines and angles

Competency 5.6.4: Recognize, classify, and use properties of two- and three-dimensional figures (e.g., circles, triangles, rectangles, cylinders)

Clothing and Interiors, Production and Services
Cosmetology
Early Childhood Education and Care
Food Production, Management, and Services
Hospitality and Facility Care Services
Meat Processor

Mathematics OCAP	Ohio Model Competency-Based Mathematics Program																																						
	PSS	NR1	NR2	NR3	NR4	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	E1	E2	E3	E4	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13	D14
UNIT 1: NUMBERS AND NUMBER RELATIONS																																									
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1.6.2	◆					◆	◆	◆	◆	◆	◆	◆		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆																
1.6.3	◆	◆		◆																																						
1.6.4	◆		◆			◆	◆												◆	◆	◆	◆			◆	◆		◆														
1.6.5	◆													◆																												
1.6.6	◆	◆	◆	◆		◆	◆					◆		◆	◆		◆		◆	◆	◆	◆	◆			◆		◆							◆							
1.6.7	◆						◆												◆	◆	◆	◆																				
1.6.8	◆	◆	◆	◆		◆	◆					◆		◆	◆		◆		◆			◆	◆		◆	◆		◆							◆							
UNIT 2: MEASUREMENT																																									
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2.6.2	◆		◆			◆		◆	◆	◆	◆	◆		◆	◆	◆			◆				◆					◆														
2.6.3	◆		◆			◆	◆				◆	◆			◆	◆							◆																			
2.6.4	◆		◆			◆	◆				◆	◆			◆	◆									◆	◆		◆														
UNIT 3: DATA ANALYSIS AND PROBABILITY																																									
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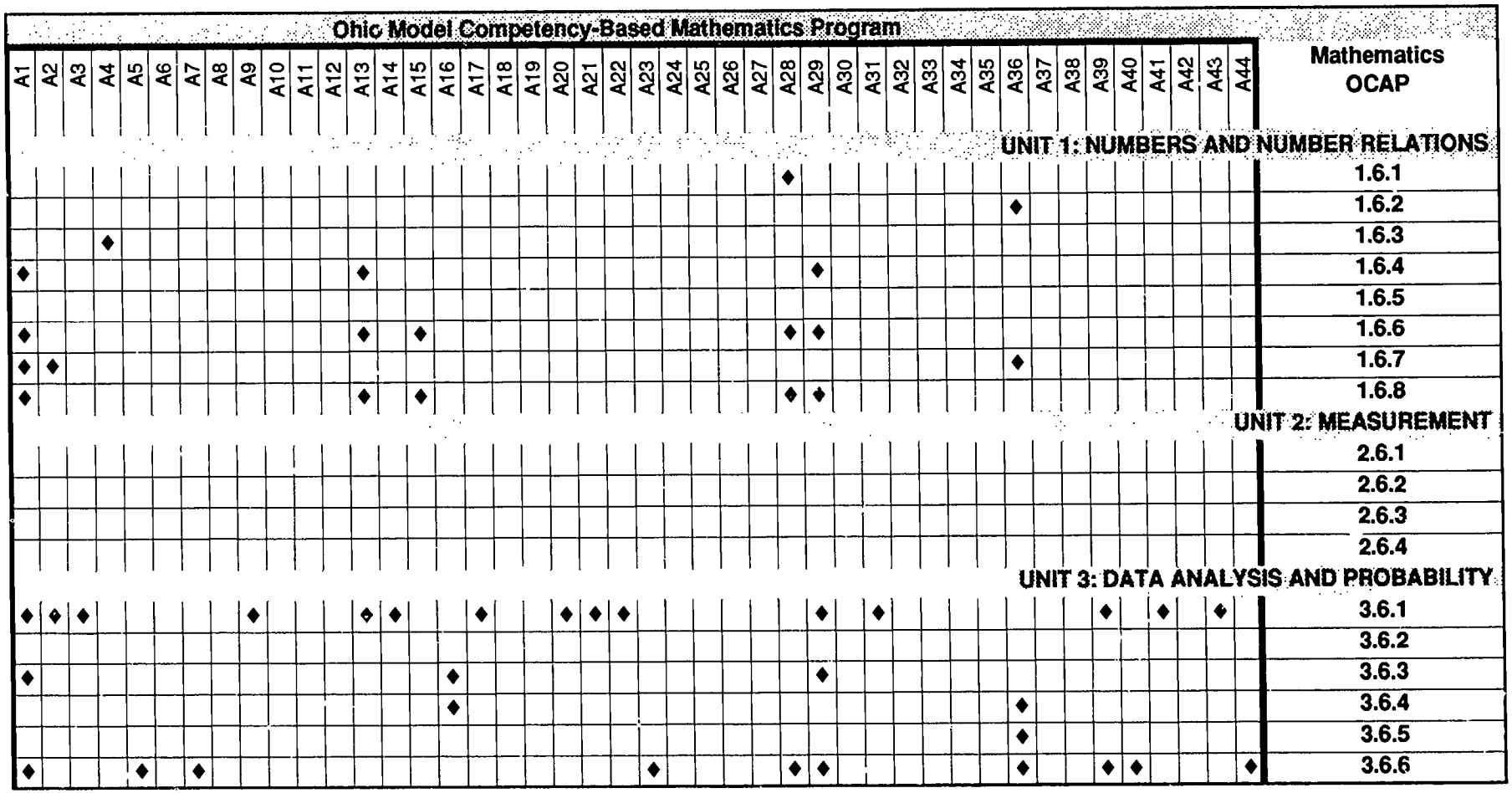
Refer to pages 78-81 for Ohio Model Competency-Based Mathematics Program codes.

Clothing and Interiors, Production and Services
Cosmetology
Early Childhood Education and Care
Food Production, Management, and Services
Hospitality and Facility Care Services
Meat Processor



Refer to pages 78-81 for Ohio Model Competency-Based Mathematics Program codes.

CROSS-REFERENCE CHART—GROUP F

Clothing and Interiors, Production and Services
Cosmetology
Early Childhood Education and Care
Food Production, Management, and Services
Hospitality and Facility Care Services
Meat Processor

Mathematics OCAP	Ohio Model Competency-Based Mathematics Program																																									
	PSS	NR1	NR2	NR3	NR4	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	E1	E2	E3	E4	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13	D14
UNIT 4: ALGEBRA																																										
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UNIT 5: GEOMETRY																																										
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5.6.2	◆		◆			◆	◆																		◆	◆		◆														
5.6.3	◆		◆	◆		◆											◆					◆				◆		◆														
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Refer to pages 78-81 for Ohio Model Competency-Based Mathematics Program codes.

Clothing and Interiors, Production and Services
Cosmetology
Early Childhood Education and Care
Food Production, Management, and Services
Hospitality and Facility Care Services
Meat Processor

Ohio Model Competency-Based Mathematics Program																																											Mathematics OCAP
A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	A18	A19	A20	A21	A22	A23	A24	A25	A26	A27	A28	A29	A30	A31	A32	A33	A34	A35	A36	A37	A38	A39	A40	A41	A42	A43	A44	
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Refer to pages 78-81 for Ohio Model Competency-Based Mathematics Program codes.

CROSS-REFERENCE CHART—GROUP F

Clothing and Interiors, Production and Services
Cosmetology
Early Childhood Education and Care
Food Production, Management, and Services
Hospitality and Facility Care Services
Meat Processor

Ohio Model Competency-Based Mathematics Program

Mathematics OCAP	G1	G2	G3	G4	G5	G6	G7	G8	G9	G10	G11	G12	G13	G14	G15	G16	G17	G18	G19	G20	G21	G22
UNIT 1: NUMBERS AND NUMBER RELATIONS																						
1.6.1																						
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UNIT 2: MEASUREMENT																						
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UNIT 3: DATA ANALYSIS AND PROBABILITY																						
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Mathematics OCAP	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15	P16	P17	P18	P19	P20	P21	P22
UNIT 1: NUMBERS AND NUMBER RELATIONS																						
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UNIT 2: MEASUREMENT																						
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2.6.3																						
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UNIT 3: DATA ANALYSIS AND PROBABILITY																						
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Refer to pages 78-81 for Ohio Model Competency-Based Mathematics Program codes.

Clothing and Interiors, Production and Services
Cosmetology
Early Childhood Education and Care
Food Production, Management, and Services
Hospitality and Facility Care Services
Meat Processor

Mathematics OCAP	Ohio Model Competency-Based Mathematics Program																																							
	G1	G2	G3	G4	G5	G6	G7	G8	G9	G10	G11	G12	G13	G14	G15	G16	G17	G18	G19	G20	G21	G22	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15	P16	P17	P18	P19	P20	P21	P22
UNIT 4: ALGEBRA																																											
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UNIT 5: GEOMETRY																																											
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5.6.4	◆	◆		◆	◆	◆	◆											◆																										

Refer to pages 78-81 for Ohio Model Competency-Based Mathematics Program codes.

Ohio Competency Analysis Profile Mathematics

for

Commercial Art
Graphic Communications: Commercial Photography
Graphic Communications: Graphic Arts

Unit 1: Numbers and Number Relations

Subunit 1.7: Group G

Competency	1.7.1:	Round and/or truncate numbers to designated place value
Competency	1.7.2:	Compute and solve problems involving integers, fractions, decimals, and percentages using order of operations
Competency	1.7.3:	Compare, order, and determine equivalence of real numbers (e.g., fractions, decimals, percentages)
Competency	1.7.4:	Estimate, apply, and solve problems involving fractions, decimals, percentages, and real numbers
Competency	1.7.5:	Set up, solve, and apply ratios and proportions
Competency	1.7.6:	Solve problems and make applications involving integers, fractions, decimals, percentages, ratios, and proportions
Competency	1.7.7:	Translate written and/or verbal statements into mathematical expressions
Competency	1.7.8:	Estimate answers

Unit 2: Measurement

Subunit 2.7: Group G

Competency	2.7.1:	Convert, compare, and compute with common units of measurement within and/or across measurement systems
Competency	2.7.2:	Compute using appropriate units of measurement
Competency	2.7.3:	Read scale on measurement device(s) to nearest mark and make interpolations where appropriate
Competency	2.7.4:	Estimate measurements

* Advancing
** Futuring

Unit 3: Data Analysis and Probability

Subunit 3.7: Group G

Competency 3.7.1: Interpret and use tables, charts, maps, and/or graphs

Competency 3.7.2: Identify patterns, note trends, and/or draw conclusions from tables, charts, maps, and/or graphs

Competency 3.7.3: Collect and organize data into tables, charts, and/or graphs

Competency 3.7.4: Compute and interpret mean, median, and/or mode

Competency 3.7.5: Use elementary notions of probability

Competency 3.7.6: Use problem-solving techniques

Unit 4: Algebra

Subunit 4.7: Group G

Competency 4.7.1: Evaluate and/or simplify algebraic expressions using simple substitutions

Competency 4.7.2: Solve linear equations

Competency 4.7.3: Use order of operations to solve problems

Competency 4.7.4: Use formulas

Unit 5: Geometry

Subunit 5.7: Group G

Competency 5.7.1: Find perimeters and areas of geometric figures

Competency 5.7.2: Find surface areas and volumes of applicable geometric figures

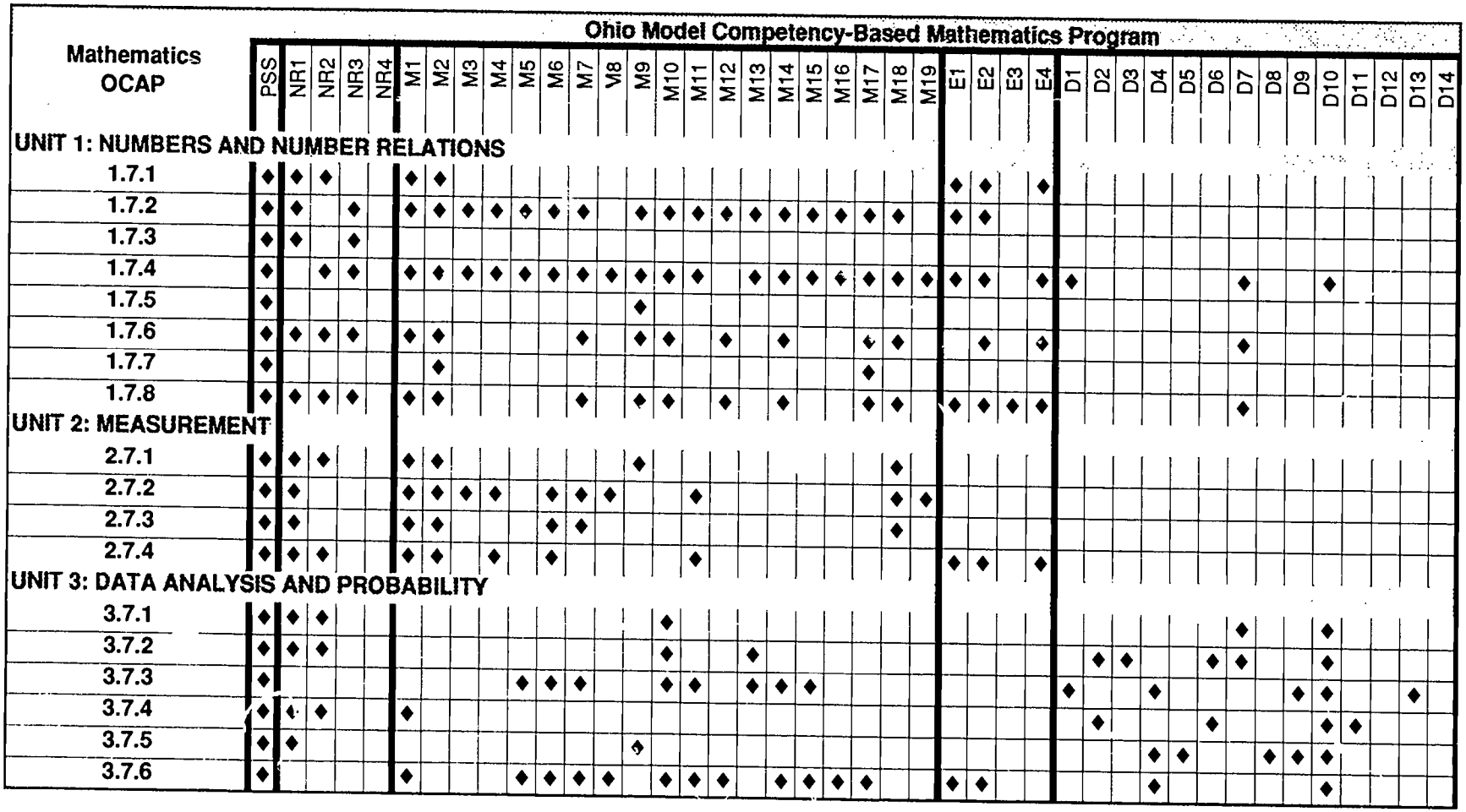
Competency 5.7.3: Recognize, classify, and use properties of lines and angles

Competency 5.7.4: Recognize, classify, and use properties of two- and three-dimensional figures (e.g., circles, triangles, rectangles, cylinders)

Competency 5.7.5: Describe and apply properties of similar and congruent figures

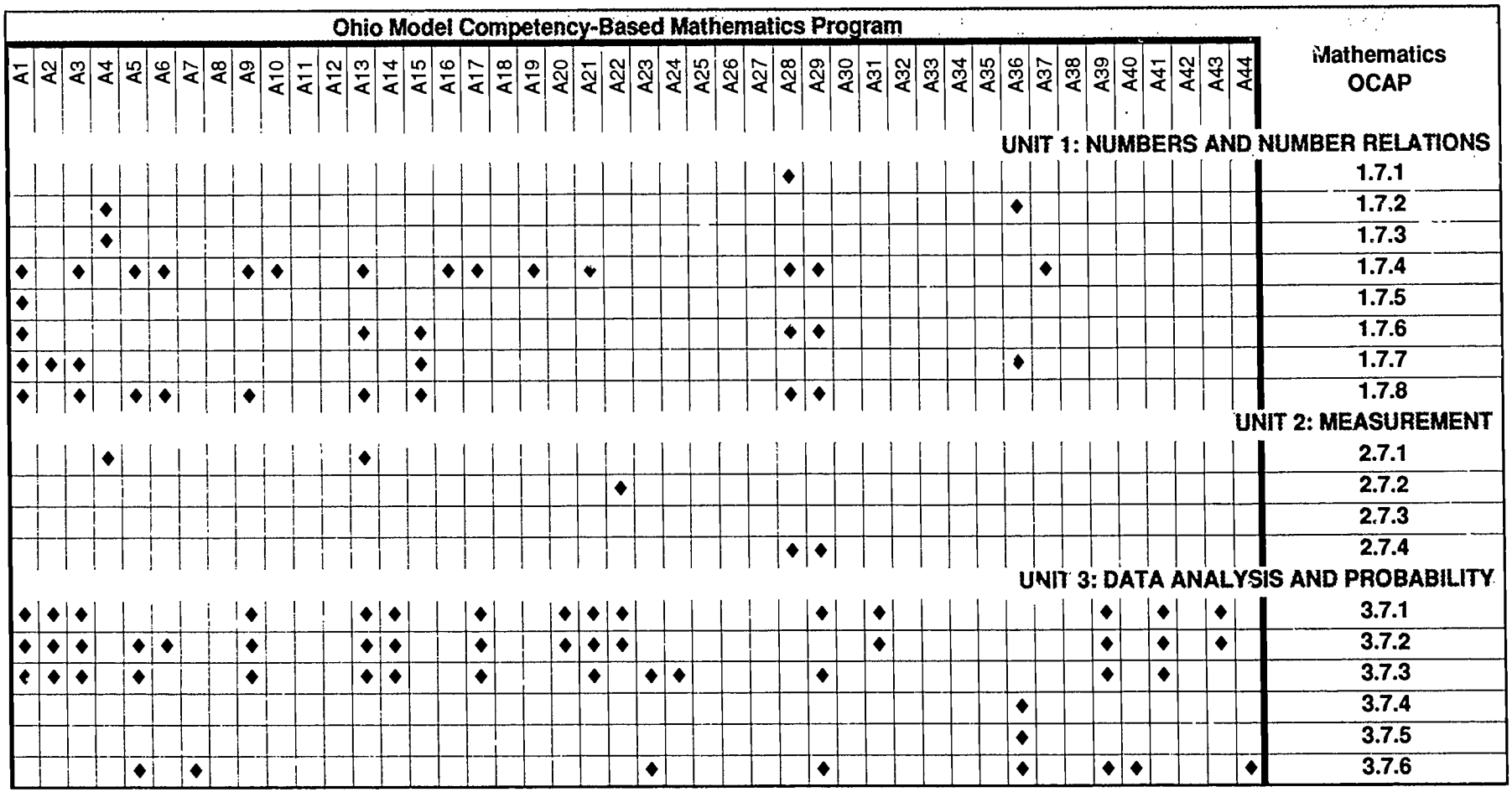
* Advancing
** Futuring

Commercial Art
Graphic Communications: Commercial Photography
Graphic Communications: Graphic Arts



Refer to pages 78-81 for Ohio Model Competency-Based Mathematics Program codes.

Commercial Art
Graphic Communications: Commercial Photography
Graphic Communications: Graphic Arts



Refer to pages 78-81 for Ohio Model Competency-Based Mathematics Program codes.

Commercial Art
Graphic Communications: Commercial Photography
Graphic Communications: Graphic Arts

Mathematics OCAP	Ohio Model Competency-Based Mathematics Program																																					
	PSS	NR1	NR2	NR3	NR4	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	E1	E2	E3	E4	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13	D14
UNIT 4: ALGEBRA																																									
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4.7.3	◆		◆																	◆	◆							◆													
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UNIT 5: GEOMETRY																																									
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Refer to pages 78-81 for Ohio Model Competency-Based Mathematics Program codes.

Commercial Art
Graphic Communications: Commercial Photography
Graphic Communications: Graphic Arts

Ohio Model Competency-Based Mathematics Program																																										Mathematics OCAP
A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	A18	A19	A20	A21	A22	A23	A24	A25	A26	A27	A28	A29	A30	A31	A32	A33	A34	A35	A36	A37	A38	A39	A40	A41	A42	A43	A44	
																																											UNIT 4: ALGEBRA
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Refer to pages 78-81 for Ohio Model Competency-Based Mathematics Program codes.

Commercial Art
Graphic Communications: Commercial Photography
Graphic Communications: Graphic Arts

Mathematics OCAP	Ohio Model Competency-Based Mathematics Program																																				
	G1	G2	G3	G4	G5	G6	G7	G8	G9	G10	G11	G12	G13	G14	G15	G16	G17	G18	G19	G20	G21	G22	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15	P16	P17	P18	P19	P20	P21	P22
UNIT 1: NUMBERS AND NUMBER RELATIONS																																					
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UNIT 2: MEASUREMENT																																											
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UNIT 3: DATA ANALYSIS AND PROBABILITY																																											
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Refer to pages 78-81 for Ohio Model Competency-Based Mathematics Program codes.

Commercial Art
Graphic Communications: Commercial Photography
Graphic Communications: Graphic Arts

Mathematics OCAP	Ohio Model Competency-Based Mathematics Program																																							
	G1	G2	G3	G4	G5	G6	G7	G8	G9	G10	G11	G12	G13	G14	G15	G16	G17	G18	G19	G20	G21	G22	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15	P16	P17	P18	P19	P20	P21	P22
UNIT 4: ALGEBRA																																										
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UNIT 5: GEOMETRY																																										
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Refer to pages 78-81 for Ohio Model Competency-Based Mathematics Program codes.

Ohio Competency Analysis Profile Mathematics

for

Drafting
Electrical Trades
Electronics
Industrial Maintenance
Machine Trades

Unit 1: Numbers and Number Relations

Subunit 1.8: Group H

Competency	1.8.1:	Round and/or truncate numbers to designated place value
Competency	1.8.2:	Compute and solve problems involving integers, fractions, decimals, and percentages using order of operations
Competency	1.8.3:	Compare, order, and determine equivalence of real numbers (e.g., fractions, decimals, percentages)
Competency	1.8.4:	Estimate, apply, and solve problems involving fractions, decimals, percentages, and real numbers
Competency	1.8.5:	Set up, solve, and apply ratios and proportions
Competency	1.8.6:	Solve problems and make applications involving integers, fractions, decimals, percentages, ratios, and proportions
Competency	1.8.7:	Translate written and/or verbal statements into mathematical expressions
Competency	1.8.8:	Estimate answers
Competency	1.8.9:	Compare, compute, and solve problems involving binary, octal, decimal, and hexadecimal numbering systems (Electronics Only)

* Advancing
** Futuring

Unit 2: Measurement

Subunit 2.8: Group H

Competency 2.8.1: Convert, compare, and compute with common units of measurement within and/or across measurement systems

Competency 2.8.2: Compute using appropriate units of measurement

Competency 2.8.3: Read scale on measurement device(s) to nearest mark and make interpolations where appropriate

Competency 2.8.4: Estimate measurements

Unit 3: Data Analysis and Probability

Subunit 3.8: Group H

Competency 3.8.1: Interpret and use tables, charts, maps, and/or graphs

Competency 3.8.2: Identify patterns, note trends, and/or draw conclusions from tables, charts, maps, and/or graphs

Competency 3.8.3: Collect and organize data into tables, charts, and/or graphs

Competency 3.8.4: Compute and interpret mean, median, and/or mode

Competency 3.8.5: Use elementary notions of probability

Competency 3.8.6: Use problem-solving techniques

Unit 4: Algebra

Subunit 4.8: Group H

Competency 4.8.1: Evaluate and/or simplify algebraic expressions using simple substitutions

Competency 4.8.2: Solve linear equations

Competency 4.8.3: Use order of operations to solve problems

Competency 4.8.4: Use formulas

Competency 4.8.5: Compare and compute using scientific notation

Competency 4.8.6: Use properties of exponents

Competency 4.8.7: Select and use appropriate problem-solving techniques

Competency 4.8.8: Determine slope, midpoint, and distance (Not Electronics)

Competency 4.8.9: Graph functions

Competency 4.8.10: Use Boolean algebra (Electronics Only)

* Advancing
** Futuring

Unit 5: Geometry

Subunit 5.8: Group H

Competency	5.8.1:	Find perimeters and areas of geometric figures
Competency	5.8.2:	Find surface areas and volumes of applicable geometric figures
Competency	5.8.3:	Recognize, classify, and use properties of lines and angles
Competency	5.8.4:	Recognize, classify, and use properties of two- and three-dimensional figures (e.g., circles, triangles, rectangles, cylinders)
Competency	5.8.5:	Apply Pythagorean theorem
Competency	5.8.6:	Describe and apply properties of similar and congruent figures (Not Electronics)

Unit 6: Trigonometry

Competency	6.0.1:	Identify basic functions of sine, cosine, and tangent
Competency	6.0.2:	Compute and solve problems using basic trigonometric functions
Competency	6.0.3:	Graph basic functions using polar and/or Cartesian coordinate systems

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Mathematics OCAP	Ohio Model Competency-Based Mathematics Program																																						
	PSS	NR1	NR2	NR3	NR4	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	E1	E2	E3	E4	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13	D14
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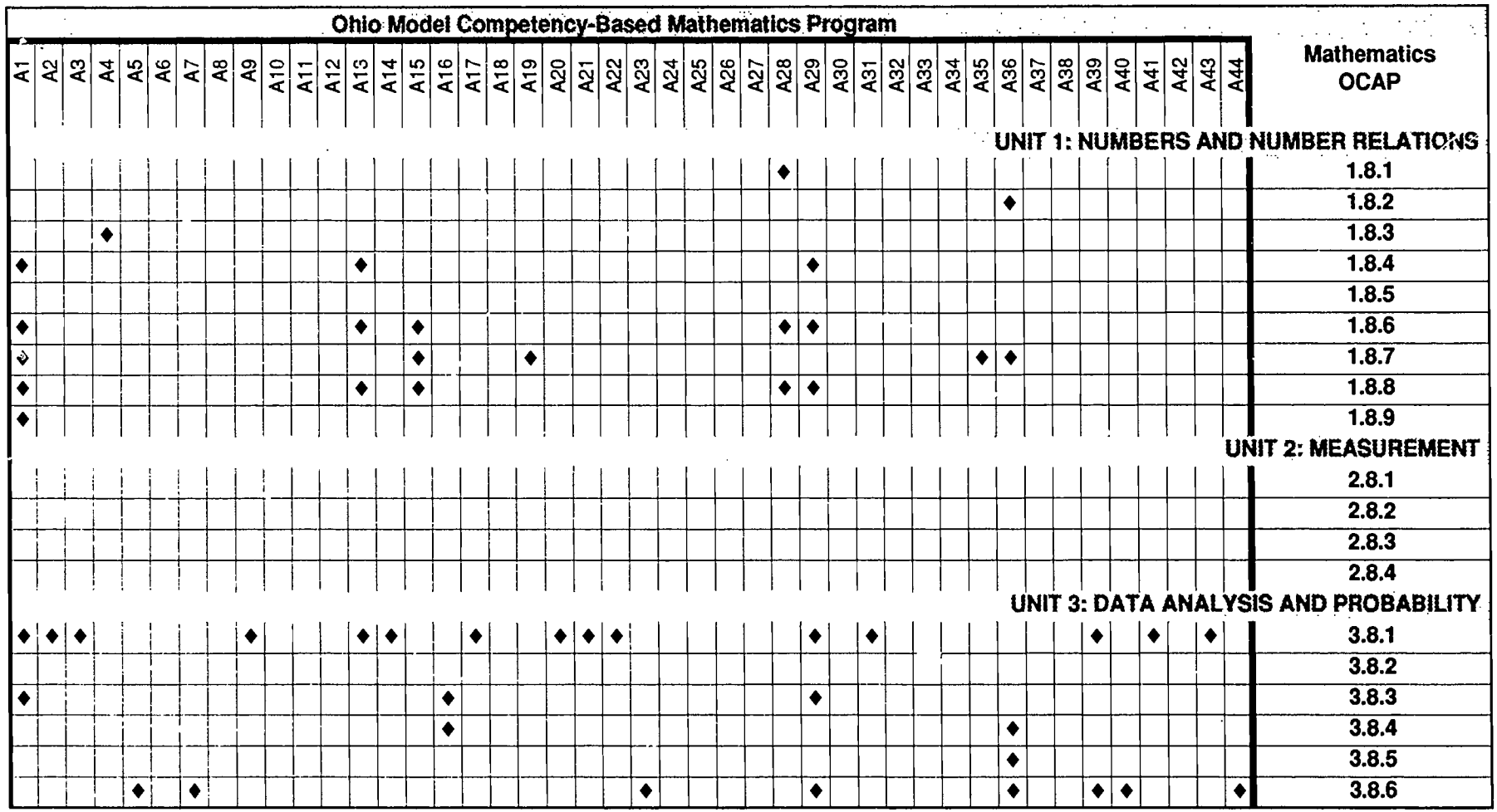

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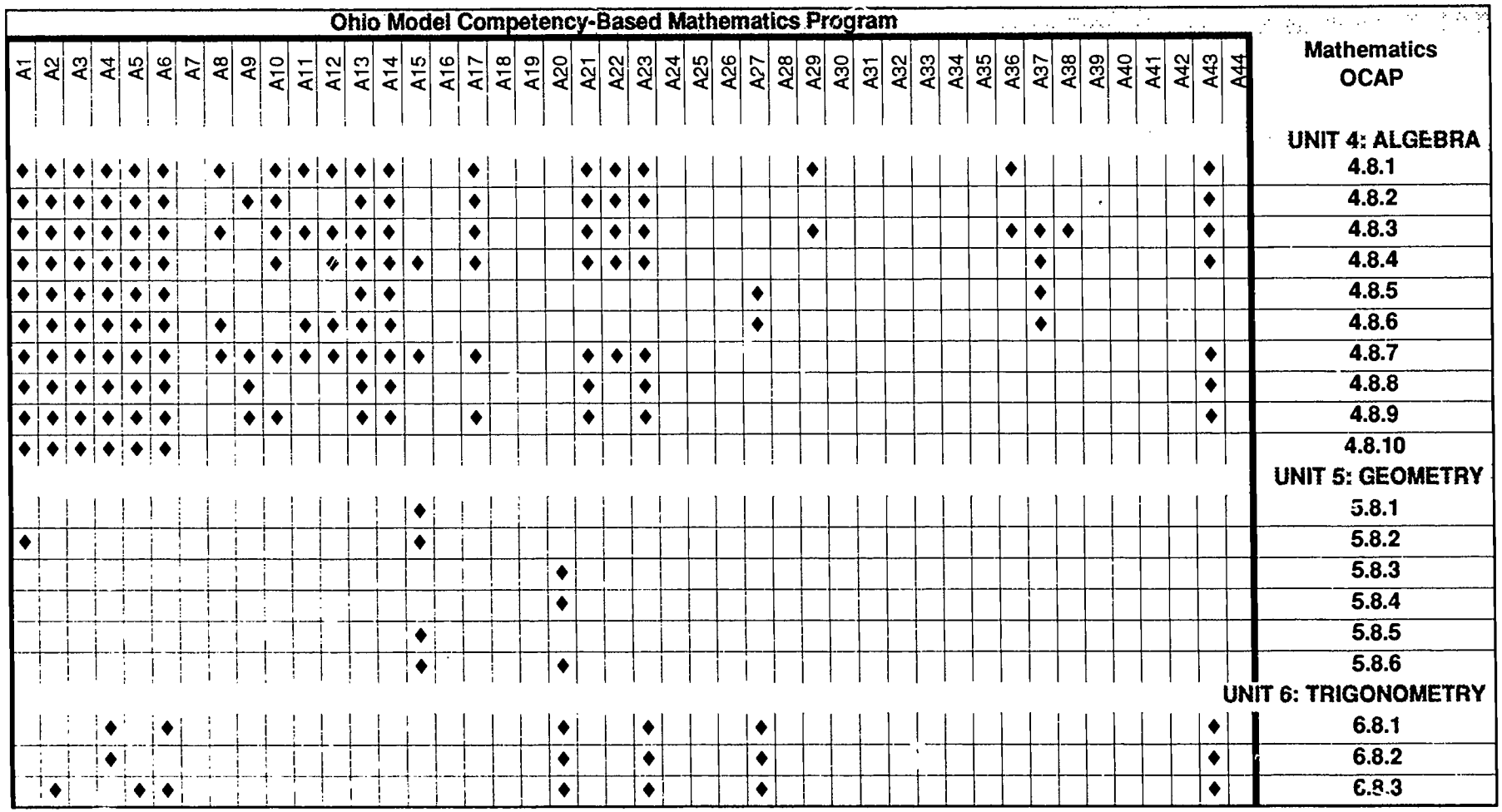

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Ohio Model Competency-Based Mathematics Program

PSS=Problem-Solving Strategies
NR=Numbers and Number Relations
M=Measurement
E=Estimation and Mental Computation
D=Data Analysis and Probability
A=Algebra
G=Geometry
P=Patterns, Relations, and Functions

Problem-Solving Strategies

Numbers and Number Relations

NR1 Compare, order, and determine equivalence of real numbers
NR2 Estimate answers, compute, and solve problems involving real numbers
NR3 Compare and contrast real number system, rational number system, and whole number system
NR4 Extend understanding to complex number system and develop facility with its operation

Measurement

M1 Estimate and use measurements
M2 Understand need for measurement and probability that any measurement is accurate to some designated specification
M3 Understand and apply measurements related to power and work
M4 Understand and apply measurement concepts of distance-rate-time problems and acceleration problems
M5 Use real experiments to investigate elasticity, heat, sound, electricity, magnetism, light, acceleration, velocity, energy, and gravity
M6 Use real-world problem situations involving mass and weight
M7 Use real-world problem situations involving simple harmonic motion
M8 Establish ratios with and without common units
M9 Construct and interpret maps, tables, charts, and graphs as they relate to real-world mathematics
M10 Understand and solve rate-change problems
M11 Understand and solve right triangle relationships as they relate to measurement, specifically to Pythagorean theorem
M12 Graph and interpret ordered pairs
M13 Compute total sales from a variety of items
M14 Comprehend and compute rates of growth or decay
M15 Comprehend, compute, and interpret real problems involving annuities
M16 Develop an ability to identify real problems and provide possible solutions
M17 Express and apply different types of measurement scales
M18 Determine area and volume

Estimation and Mental Computation

E1 Use estimation to eliminate choices in multiple-choice tests
E2 Use estimation to determine reasonableness of problem situations in a wide variety of applications
E3 Estimate shape of graphs of various functions and algebraic expressions
E4 Use mental computation when computer and calculator are inappropriate

Data Analysis and Probability

D1 Organize data into tables, charts, and graphs
D2 Understand and apply measures of central tendency, variability, and correlation
D3 Use curve fitting to predict from data
D4 Use experimental or theoretical probability, as appropriate, to represent and solve problems involving uncertainty
D5 Use computer simulations and random number generators to estimate probabilities
D6 Test hypotheses using appropriate statistics
D7 Read, interpret, and use tables, charts, and graphs to identify patterns, note trends, draw conclusions, and make predictions
D8 Determine probabilities of events involving unbiased objects
D9 Use sampling and recognize its role in statistical claims
D10 Design a statistical experiment to study problem, conduct experiment, and interpret and communicate outcomes
D11 Describe normal curve in general terms and use its properties
D12 Create and interpret discrete probability distributions
D13 Understand concept of random variable
D14 Apply concept of random variable to generate and interpret probability distributions, including binomial, uniform, normal, and chi square

Algebra

A1 Describe problem situations by using and relating numerical, symbolic, and graphical representations
A2 Use language and notation of functions in symbolic and graphing settings
A3 Recognize and use equivalent zeros of a function, roots and the solution of an equation in terms of graphical and symbolic representations
A4 Describe and use logic of equivalence in working with equations, inequalities, and functions
A5 Develop graphical techniques of solution for problem situations involving functions
A6 Explore and describe characterizing features of functions
A7 Make arguments and proofs in algebraic settings
A8 Factor difference of two squares
A9 Determine slope, midpoint, and distance
A10 Explore and combine rational functions
A11 Explore factoring techniques
A12 Solve quadratic equations by factoring and formula
A13 Set up and solve linear equations
A14 Solve systems of linear equations with two variables
A15 Describe geometric situations and phenomena using variables, equations, and functions
A16 Describe measures of central tendency, mean, median, mode, and variance algebraically and graphically
A17 Represent inequalities on number line and in coordinate plane

A18 Use coordinate arguments in making geometric proofs
A19 Symbolize transformations of figures and graphs
A20 Explore geometric basis for functions of trigonometry
A21 Graph linear functions
A22 Develop and use vectors to represent direction and magnitude including operations
A23 Use polar and parametric equations to describe, graph, and solve problem situations
A24 Represent sequences and series as functions both algebraically and graphically
A25 Explore recursive functions and procedures using spreadsheets, other computer utilities, and appropriate notions
A26 Describe and solve algebraic situations with matrices
A27 Describe and use inverse relationship between functions including exponential and logarithmic
A28 Analyze and describe errors and error sources that can be made when using computers and calculators to solve problems
A29 Decide whether problem situation is best solved using computer, calculator, paper and pencil, or mental arithmetic/estimation techniques
A30 Explore relationships between complex numbers and vectors
A31 Make arguments concerning limits, convergence and divergence in context involving sequences, series, and other types of functions
A32 Represent transformations in plane with matrices
A33 Contrast and compare algebras of rational, real, and complex numbers with characteristics of a matrix algebra system
A34 Construct polynomial approximations of a function over specified intervals of convergence
A35 Examine complex numbers as zeros of functions
A36 Translate verbal statements into symbolic language
A37 Simplify algebraic expressions
A38 Use laws and exponents (including scientific notation)
A39 Expand and extend idea of vectors and linear algebra to higher dimensional situations
A40 Use the idea of independent basis elements for a vector space and associated fundamental concepts of finite dimensional linear algebra
A41 Develop and communicate arguments about limit situations
A42 Use matrices to describe and apply transformations
A43 Develop and use polar and parametric equations to represent problem situations
A44 Explore proofs by mathematical induction

Geometry

G1 Create and interpret drawings of three-dimensional objects
G2 Represent problem situations with geometric models and apply properties of figures
G3 Apply Pythagorean theorem
G4 Demonstrate understanding of angles and parallel and perpendicular lines
G5 Explore inductive and deductive reasoning through applications to various subject areas
G6 Translate between synthetic and coordinate representations
G7 Identify congruent and similar figures using transformations with computer programs
G8 Deduce properties of figures using transformations and coordinates
G9 Use deductive reasoning
G10 Explore compass and straightedge constructions in context of geometric theorems
G11 Demonstrate understanding of and ability to use proof
G12 Use variety of proof techniques (e.g., synthetic, transformational, and coordinate)

G13 Use variety of proof formats, including T-proof (i.e., two-column) and paragraph proof
G14 Explore different proof strategies
G15 Investigate different proofs of theorems
G16 Develop understanding of an axiomatic system
G17 Apply transformations and coordinates in problem solving
G18 Represent problem situations with geometric models and apply properties of figures
G19 Deduce properties of figures using vectors
G20 Analyze properties of Euclidian transformations and relate translations to vectors
G21 Apply vectors in problem solving
G22 Develop further understanding of axiomatic systems by investigating and comparing various geometries

Patterns, Relations, and Functions

P1 Model real-world phenomena with polynomial and exponential functions
P2 Explore relationship between zeros and intercepts of functions
P3 Translate among tables, algebraic expressions, and graphs of functions
P4 Use graphing calculator or computer to generate graph of a function
P5 Explore relationship between a linear function and its inverse
P6 Describe and use characteristics of polynomial functions in problem-solving situations
P7 Explore conic sections and graph using graphing calculator or computer
P8 Apply trigonometric functions to problem situations involving triangles
P9 Discover relationships between algebraic description, kind, and properties of conic
P10 Explore periodic real-world phenomena using sine and cosine functions
P11 Analyze effects of parameter changes on graphs
P12 Use graphing calculator or computer to graph functions
P13 Develop an understanding of rational and transcendental functions
P14 Understand connections between trigonometric and circular functions
P15 Use circular functions to model periodic real-world functions
P16 Solve trigonometric equations and verify trigonometric identities
P17 Understand connections between trigonometric, exponential, and logarithmic functions and polar coordinates, complex numbers, and series
P18 Model real-world phenomena with a variety of functions
P19 Graph using polar coordinates
P20 Explore graphs in three dimensions
P21 Explore functions of several variables
P22 Explore recursive functions using spreadsheets and/or programming languages

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