

## DOCUMENT RESUME

ED 357 275

CE 063 744

TITLE Mathematics. Ohio's Competency Analysis Profile.

INSTITUTION Ohio State Univ., Columbus. Vocational Instructional Materials Lab.

SPONS AGENCY Ohio State Dept. of Education, Columbus. Div. of Vocational and Career Education.

PUB DATE Aug 92

NOTE 127p.; For related documents, see ED 338 827-852, ED 345 048-082, and CE 063 711 and CE 063 743.

AVAILABLE FROM Vocational Instructional Materials Lab, Ohio State University, 1900 Kenny Road, Columbus, OH 43210-1090 (\$1.50).

PUB TYPE Guides - Classroom Use - Teaching Guides (For Teacher) (052)

EDRS PRICE MF01/PC06 Plus Postage.

DESCRIPTORS Algebra; Competency Based Education; \*Correlation; Data Analysis; Geometry; Mathematical Applications; \*Mathematics Skills; Measurement; \*Minimum Competencies; Models; Number Concepts; Numeracy; Probability; Secondary Education; Statewide Planning; \*Vocational Education  
\*Ohio Competency Analysis Profiles

IDENTIFIERS

## 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 Ohio Model Competency-Based Mathematics Program. A copy of the Ohio Model Competency-Based Mathematics Program concludes the profile. (MN)

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# 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.

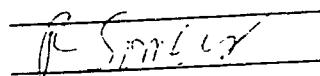
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Division of Vocational and  
Career Education  
Ohio Department of Education

Vocational Instructional Materials Laboratory  
Center on Education and Training  
for Employment



**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

## **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\*

## 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\**

## 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*

## 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

Ohio Model Competency-Based Mathematics Program		Mathematics OCAP	Mathematics OCAP	
		UNIT 1: NUMBERS AND NUMBER RELATION	UNIT 2: MEASUREMENT	UNIT 3: DATA ANALYSIS AND PROBABILITY
A44	◆	1.1.1	2.1.1	3.1.1
A43		1.1.2	2.1.2	3.1.2
A42		1.1.3	2.1.3	3.1.3
A41		1.1.4	2.1.4	3.1.4
A40		1.1.5		3.1.5
A39		1.1.6		3.1.6
A38		1.1.7		
A37		1.1.8		
A36				
A35				
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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*

Mathematics OCAP		Ohio Model Competency-Based Mathematics Program																																					
		M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13	D14					
UNIT 4: ALGEBRA		◆																			◆																		
4.1.1	◆	◆																			◆																		
4.1.2	◆	◆	◆																		◆																		
4.1.3	◆	◆	◆	◆																	◆																		
4.1.4	◆	◆	◆	◆	◆															◆	◆																		
4.1.5*	◆	◆	◆	◆	◆	◆															◆																		
4.1.6*	◆	◆	◆	◆	◆	◆	◆														◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆						
UNIT 5: GEOMETRY																					◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆					
5.1.1	◆																				◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆					
5.1.2	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	
5.1.3	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	
5.1.4	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	
5.1.5*	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆

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

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**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*

Ohio Model Competency-Based Mathematics Program		Mathematics OCAP					
		UNIT 4: ALGEBRA					
		4.1.4		4.1.2		4.1.3	
A44							
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A6							
A5							
A4							
A3							
A2							
A1							

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

Ohio Model Competency-Based Mathematics Program	
Mathematics OCAP	
G1	
G2	
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G13	
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P1	
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P7	
P8	
P9	
P10	
P11	
P12	
P13	
P14	
P15	
P16	
P17	
P18	◆
P19	◆
P20	◆
P21	◆
P22	◆
<b>UNIT 1: NUMBERS AND NUMBER RELATIONS</b>	
1.1.1	
1.1.2	
1.1.3	
1.1.4	
1.1.5	
1.1.6	◆
1.1.7	◆
1.1.8	◆
<b>UNIT 2: MEASUREMENT</b>	
2.1.1	
2.1.2	
2.1.3	
2.1.4	
<b>UNIT 3: DATA ANALYSIS AND PROBABILITY</b>	
3.1.1	
3.1.2	
3.1.3	
3.1.4	
3.1.5	
3.1.6	
3.1.7	◆

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*

Mathematics OCAP		Ohio Model Competency-Based Mathematics Program																						
<b>UNIT 4: ALGEBRA</b>		G22	G21	G20	G19	G18	G17	G16	G15	G14	G13	G12	G11	G10	G9	G8	G7	G6	P5	P4	P3	P2	P1	
4.1.1																								
4.1.2																								
4.1.3																								
4.1.4																								
4.1.5*																								
4.1.6*																								
<b>UNIT 5: GEOMETRY</b>																								
5.1.1																								
5.1.2																								
5.1.3																								
5.1.4																								
5.1.5*																								

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

## **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

2.7

## 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\**

**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																									
	Ohio Model Competency-Based Mathematics Program																									
	Ohio Model Competency-Based Mathematics Program																									
<b>UNIT 1: NUMBERS AND NUMBER RELATIONS</b>																										
1.2.1	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
1.2.2	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
1.2.3	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
1.2.4	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
1.2.5	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
1.2.6	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
1.2.7	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
1.2.8	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
<b>UNIT 2: MEASUREMENT</b>																										
2.2.1	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
2.2.2	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
2.2.3	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
2.2.4	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
<b>UNIT 3: DATA ANALYSIS AND PROBABILITY</b>																										
3.2.1	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
3.2.2	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
3.2.3	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
3.2.4	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
3.2.5	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
3.2.6	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆

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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	UNIT 1: NUMBERS AND NUMBER RELATIONS	UNIT 2: MEASUREMENT	UNIT 3: DATA ANALYSIS AND PROBABILITY
A44		1.2.1		
A43			2.2.1	3.2.1
A42			2.2.2	3.2.2
A41			2.2.3	3.2.3
A40			2.2.4	3.2.4
A39				3.2.5
A38				3.2.6
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A1				

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*

Mathematics OCAP		Ohio Model Competency-Based Mathematics Program																																		
UNIT 4: ALGEBRA		PSS	NR1	NR2	NR3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13	D14	
4.2.1	◆					◆															◆															
4.2.2	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆															
4.2.3	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆															
4.2.4	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆															
4.2.5	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆															
4.2.6	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆															
UNIT 5: GEOMETRY		Ohio Model Competency-Based Mathematics Program																																		
5.2.1	◆																																			
5.2.2	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆															
5.2.3	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆															
5.2.4	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆															
5.2.5	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆															
5.2.6	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆															

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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  
 Garden Center Worker  
 Resource Conservation  
 Turf and Landscape Worker*

Ohio Model Competency-Based Mathematics Program		Mathematics OCAP	UNIT 4: ALGEBRA	UNIT 5: GEOMETRY
A44			4.2.1	
A43				5.2.1
A42				5.2.2
A41				5.2.3
A40				5.2.4
A39				5.2.5
A38				5.2.6
A37				
A36				
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Refer to pages 78-81 for Ohio Model Competency-Based Mathematics Program codes.

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**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																								
<b>UNIT 1: NUMBERS AND NUMBER RELATIONS</b>																									
1.2.1																									
1.2.2																									
1.2.3																									
1.2.4																									
1.2.5																									
1.2.6																									
1.2.7																									
1.2.8																									
<b>UNIT 2: MEASUREMENT</b>																									
2.2.1																									
2.2.2																									
2.2.3																									
2.2.4																									
<b>UNIT 3: DATA ANALYSIS AND PROBABILITY</b>																									
3.2.1																									
3.2.2																									
3.2.3																									
3.2.4																									
3.2.5																									
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 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

## **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\*

## 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\**

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

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		
			UNIT 1: NUMBERS AND NUMBER RELATIONS	
A1	A1		1.3.1	
A2		◆		1.3.2
A3		◆		1.3.3
A4		◆		1.3.4
A5		◆		1.3.5
A6		◆		1.3.6
A7		◆		1.3.7
A8		◆		1.3.8
A9		◆		
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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 C

- 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*

Ohio Model Competency-Based Mathematics Program		Mathematics OCAP	Mathematics OCAP	Mathematics OCAP	Mathematics OCAP
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A1					

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*

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																						
UNIT 4: ALGEBRA		G22	G21	G20	G19	G18	G17	G16	G15	G14	G13	G12	G11	G10	G9	G8	G7	G6	G5	G4	G3	G2	G1	
4.3.1	◆																							
4.3.2		◆																						
4.3.3		◆	◆																					
4.3.4		◆	◆	◆																				
4.3.5*					◆																			
4.3.6*						◆																		
UNIT 5: GEOMETRY		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
5.3.1		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
5.3.2		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
5.3.3		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
5.3.4			◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
5.3.5*			◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
5.3.6*			◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆

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

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2  
C

# 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

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## **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

**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																			
<b>UNIT 1: NUMBERS AND NUMBER RELATIONS</b>																					
1.4.1	PSS	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
1.4.2	ZR1	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
1.4.3	ZR2	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
1.4.4	ZR3	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
1.4.5	M1	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
1.4.6	M2	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
1.4.7	M3	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
1.4.8	M4	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
<b>UNIT 2: MEASUREMENT</b>																					
2.4.1	ZR4	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
2.4.2	M5	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
2.4.3	M6	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
2.4.4	M7	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
<b>UNIT 3: DATA ANALYSIS AND PROBABILITY</b>																					
3.4.1	M8	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
3.4.2	M9	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
3.4.3	M10	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
3.4.4	M11	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
3.4.5	M12	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
3.4.6	M13	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆

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	UNIT 1: NUMBERS AND NUMBER RELATIONS	UNIT 2: MEASUREMENT	UNIT 3: DATA ANALYSIS AND PROBABILITY
A1	A1		1.4.1	2.4.1	3.4.1
A2	A2	◆	1.4.2	2.4.2	3.4.2
A3	A3	◆	1.4.3	2.4.3	3.4.3
A4	A4	◆	1.4.4	2.4.4	3.4.4
A5	A5	◆	1.4.5		3.4.5
A6	A6	◆	1.4.6		3.4.6
A7	A7	◆	1.4.7		
A8	A8	◆	1.4.8		
A9	A9	◆			
A10	A10	◆			
A11	A11	◆			
A12	A12	◆			
A13	A13	◆			
A14	A14	◆			
A15	A15	◆			
A16	A16	◆			
A17	A17	◆			
A18	A18	◆			
A19	A19	◆			
A20	A20	◆			
A21	A21	◆			
A22	A22	◆			
A23	A23	◆			
A24	A24	◆			
A25	A25	◆			
A26	A26	◆			
A27	A27	◆			
A28	A28	◆			
A29	A29	◆			
A30	A30	◆			
A31	A31	◆			
A32	A32	◆			
A33	A33	◆			
A34	A34	◆			
A35	A35	◆			
A36	A36	◆			
A37	A37	◆			
A38	A38	◆			
A39	A39	◆			
A40	A40	◆			
A41	A41	◆			
A42	A42	◆			
A43	A43	◆			
A44	A44	◆			

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*

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	
		<b>UNIT 4: ALGEBRA</b>	
A44		4.4.1	
A43		4.4.2	
A42		4.4.3	
A41		4.4.4	
A40			
A39			
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A14	◆		
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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																												
		Program Codes																												
<b>UNIT 1: NUMBERS AND NUMBER RELATIONS</b>																														
1.4.1																														
1.4.2																														
1.4.3																														
1.4.4																														
1.4.5																														
1.4.6																														
1.4.7																														
1.4.8																														
<b>UNIT 2: MEASUREMENT</b>																														
2.4.1																														
2.4.2																														
2.4.3																														
2.4.4																														
<b>UNIT 3: DATA ANALYSIS AND PROBABILITY</b>																														
3.4.1																														
3.4.2																														
3.4.3																														
3.4.4																														
3.4.5																														
3.4.6																														

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																						
UNIT 4: ALGEBRA	4.4.1	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	
	4.4.2	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
	4.4.3	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
	4.4.4	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
UNIT 5: GEOMETRY		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
	5.4.1	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
	5.4.2	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
	5.4.3	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
	5.4.4	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
	5.4.5	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
	5.4.6	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆

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

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## **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

65

## **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*

## CROSS-REFERENCE CHART—GROUP E

*Dental Assistant*  
*Diversified Health Occupations*  
*Medical Assistant*  
*Nurse Aide*  
*Practical Nursing*

Ohio Model Competency-Based Mathematics Program		Mathematics		OCAP	
		UNIT 1: NUMBERS AND NUMBER RELATIONS		UNIT 2: MEASUREMENT	
		1.5.1		2.5.1	
A1		◆	◆	◆	◆
A2		◆	◆	◆	◆
A3		◆	◆	◆	◆
A4		◆	◆	◆	◆
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1.5.2		◆	◆	◆	◆
1.5.3		◆	◆	◆	◆
1.5.4		◆	◆	◆	◆
1.5.5		◆	◆	◆	◆
1.5.6		◆	◆	◆	◆
1.5.7		◆	◆	◆	◆
1.5.8		◆	◆	◆	◆
1.5.9		◆	◆	◆	◆
1.5.10		◆	◆	◆	◆
2.5.1		◆	◆	◆	◆
2.5.2		◆	◆	◆	◆
2.5.3		◆	◆	◆	◆
2.5.4		◆	◆	◆	◆
3.5.1		◆	◆	◆	◆
3.5.2		◆	◆	◆	◆
3.5.3		◆	◆	◆	◆
3.5.4		◆	◆	◆	◆
3.5.5		◆	◆	◆	◆
3.5.6		◆	◆	◆	◆

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																								
UNIT 4: ALGEBRA																										
4.5.1	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
4.5.2	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
4.5.3	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
4.5.4	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
UNIT 5: GEOMETRY																										
5.5.1	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
5.5.2	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
5.5.3	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
5.5.4	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆

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*

<b>Ohio Model Competency-Based Mathematics Program</b>		<b>Mathematics OCAP</b>	
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A1			
		<b>UNIT 4: ALGEBRA</b>	
4.5.1			
4.5.2			
4.5.3			
4.5.4			
		<b>UNIT 5: GEOMETRY</b>	
5.5.1			
5.5.2			
5.5.3			
5.5.4			

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	UNIT 1: NUMBERS AND NUMBER RELATIONS	UNIT 2: MEASUREMENT	UNIT 3: DATA ANALYSIS AND PROBABILITY
G5	1.5.1	2.5.1	3.5.1
G6	1.5.2	2.5.2	3.5.2
G7	1.5.3	2.5.3	3.5.3
G8	1.5.4	2.5.4	3.5.4
G9	1.5.5		3.5.5
G10	1.5.6		3.5.6
G11	1.5.7		3.5.7
G12	1.5.8		3.5.8
G13	1.5.9		3.5.9
G14	1.5.10		3.5.10
G15			3.5.11
G16			3.5.12
G17			3.5.13
G18			3.5.14
G19			3.5.15
G20			3.5.16
G21			3.5.17
G22			3.5.18
P1			3.5.19
P2			3.5.20
P3			3.5.21
P4			3.5.22
P5			3.5.23
P6			3.5.24
P7			3.5.25
P8			3.5.26
P9			3.5.27
P10			3.5.28
P11			3.5.29
P12			3.5.30
P13			3.5.31
P14			3.5.32
P15			3.5.33
P16			3.5.34
P17			3.5.35
P18			3.5.36
P19			3.5.37
P20			3.5.38
P21			3.5.39
P22			3.5.40

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	
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	◆ ◆ ◆
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P19	◆ ◆ ◆
P20	◆ ◆ ◆
P21	◆ ◆ ◆
P22	◆ ◆ ◆
4.5.1	4.5.2 4.5.3 4.5.4
UNIT 4: ALGEBRA	5.5.1 5.5.2 5.5.3 5.5.4
Mathematics OCAP	UNIT 5: GEOMETRY

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

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## 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*

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	Mathematics OCAP
A1	A2	UNIT 1: NUMBERS AND NUMBER RELATIONS	1.6.1
A2	A3		1.6.2
A3	A4		1.6.3
A4	A5		1.6.4
A5	A6		1.6.5
A6	A7		1.6.6
A7	A8		1.6.7
A8	A9		1.6.8
A9	A10	UNIT 2: MEASUREMENT	2.6.1
A10	A11		2.6.2
A11	A12		2.6.3
A12	A13		2.6.4
A13	A14	UNIT 3: DATA ANALYSIS AND PROBABILITY	3.6.1
A14	A15		3.6.2
A15	A16		3.6.3
A16	A17		3.6.4
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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																							
<b>UNIT 4: ALGEBRA</b>		M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	D1		
4.6.1		◆																			◆	D14	
4.6.2		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	D13	
4.6.3		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	D12	
4.6.4		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	D11	
<b>UNIT 5: GEOMETRY</b>		PSS	NR1	NR2	NR3	NR4	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	D10	
5.6.1		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	D9
5.6.2		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	D8
5.6.3		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	D7
5.6.4		◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	D6

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			
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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*

Mathematics		Ohio Model Competency-Based Mathematics Program																																																						
OCAP	Program Codes	P22	P21	P20	P19	P18	P17	P16	P15	P14	P13	P12	P11	P10	P9	P8	P7	P6	P5	P4	P3	P2	P1	P0	P9	P8	P7	P6	P5	P4	P3	P2	P1	P0	G22	G21	G20	G19	G18	G17	G16	G15	G14	G13	G12	G11	G10	G9	G8	G7	G6	G5	G4	G3	G2	G1
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Refer to pages 78-81 for Ohio Model Competency-Based Mathematics Program codes.

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CROSS-REFERENCE CHART—GROUP F

*Clothing and Interiors, Production and Services  
 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																						
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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

5.2

## **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

CROSS-REFERENCE CHART—GROUP G

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

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.

**CROSS-REFERENCE CHART—GROUP G**

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

Ohio Model Competency-Based Mathematics Program		Mathematics OCAP	
A44		UNIT 1: NUMBERS AND NUMBER RELATIONS	1.7.1
A43			1.7.2
A42			1.7.3
A41			1.7.4
A40			1.7.5
A39			1.7.6
A38			1.7.7
A37			1.7.8
A36		UNIT 2: MEASUREMENT	
A35			2.7.1
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Refer to pages 78-81 for Ohio Model Competency-Based Mathematics Program codes.

CROSS-REFERENCE CHART—GROUP G

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

Mathematics OCAP		Ohio Model Competency-Based Mathematics Program																										
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<b>UNIT 4: ALGEBRA</b>																												
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4.7.3	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆		
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<b>UNIT 5: GEOMETRY</b>																												
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5.7.2	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆		
5.7.3	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆		
5.7.4	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆		
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Refer to pages 78-81 for Ohio Model Competency-Based Mathematics Program codes.

**CROSS-REFERENCE CHART—GROUP G**

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

Ohio Model Competency-Based Mathematics Program		Mathematics OCAP	
		UNIT 4: ALGEBRA	
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A41		◆	4.7.4
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Refer to pages 78-81 for Ohio Model Competency-Based Mathematics Program codes.

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**CROSS-REFERENCE CHART—GROUP G**

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

Mathematics OCAP	Ohio Model Competency-Based Mathematics Program																									
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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.

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**CROSS-REFERENCE CHART—GROUP G**

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

Mathematics OCAP	Ohio Model Competency-Based Mathematics Program																						
<b>UNIT 4: ALGEBRA</b>																							
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<b>UNIT 5: GEOMETRY</b>																							
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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*

U

## 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)

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## **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)

## **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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**CROSS-REFERENCE CHART—GROUP H**

*Drafting*  
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*Machine Trades*

Mathematics OCAP	Ohio Model Competency-Based Mathematics Program																	
	D14 D13 D12 D11 D10 D9 D8 D7 D6 D5 D4 D3 D2 D1 E4 E3 E2 E1 M19 M18 M17 M16 M15 M14 M13 M12 M11 M10 M9 M8 M7 M6 M5 M4 M3 M2 M1 NR4 NR3 NR2 NR1 PS5																	
UNIT 1: NUMBERS AND NUMBER RELATIONS																		
1.8.1	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
1.8.2	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
1.8.3	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
1.8.4	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
1.8.5	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
1.8.6	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
1.8.7	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
1.8.8	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
1.8.9	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
UNIT 2: MEASUREMENT																		
2.8.1	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
2.8.2	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
2.8.3	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
2.8.4	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
UNIT 3: DATA ANALYSIS AND PROBABILITY																		
3.8.1	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
3.8.2	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
3.8.3	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
3.8.4	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
3.8.5	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
3.8.6	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆

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Ohio Model Competency-Based Mathematics Program

Mathematics OCAP	UNIT 1: NUMBERS AND NUMBER RELATIONS	UNIT 2: MEASUREMENT	UNIT 3: DATA ANALYSIS AND PROBABILITY
A44	1.8.1	2.8.1	3.8.1
A43	1.8.2	2.8.2	3.8.2
A42	1.8.3	2.8.3	3.8.3
A41	1.8.4		3.8.4
A40	1.8.5		3.8.5
A39	1.8.6		3.8.6
A38	1.8.7		
A37	1.8.8		
A36	1.8.9		
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A5			
A4			
A3			
A2			
A1			

CROSS-REFERENCE CHART—GROUP H

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Machine Trades*

Ohio Model Competency-Based Mathematics Program									
Mathematics OCAP	PSS	NR1	NR2	NR3	NR4	M1	M2	M3	M4
<b>UNIT 4: ALGEBRA</b>									
4.8.1	◆								
4.8.2	◆	◆	◆	◆	◆				
4.8.3	◆	◆	◆	◆	◆				
4.8.4		◆	◆	◆	◆				
4.8.5	◆	◆	◆	◆	◆				
4.8.6	◆	◆	◆	◆	◆				
4.8.7	◆	◆	◆	◆	◆				
4.8.8	◆	◆	◆	◆	◆				
4.8.9	◆	◆	◆	◆	◆				
4.8.10	◆								
<b>UNIT 5: GEOMETRY</b>									
5.8.1	◆								
5.8.2	◆								
5.8.3		◆							
5.8.4	◆	◆	◆	◆	◆				
5.8.5	◆	◆	◆	◆	◆				
5.8.6	◆	◆	◆	◆	◆				
<b>UNIT 6: TRIGONOMETRY</b>									
6.8.1	◆								
6.8.2	◆	◆	◆	◆	◆				
6.8.3	◆	◆	◆	◆	◆				

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**CROSS-REFERENCE CHART—GROUP H**

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Electronics  
Industrial Maintenance  
Machine Trades*

<b>Ohio Model Competency-Based Mathematics Program</b>		Mathematics OCAP																			
		UNIT 4: ALGEBRA					UNIT 5: GEOMETRY					UNIT 6: TRIGONOMETRY									
		4.8.1		4.8.2		4.8.3		4.8.4		4.8.5		4.8.6		4.8.7		4.8.8		4.8.9		4.8.10	
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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CROSS-REFERENCE CHART—GROUP H

*Drafting*  
*Electrical Trades*  
*Electronics*  
*Industrial Maintenance*  
*Machine Trades*

Mathematics OCAP	Ohio Model Competency-Based Mathematics Program	
<b>UNIT 1: NUMBERS AND NUMBER RELATIONS</b>		
1.8.1		
1.8.2		
1.8.3		
1.8.4		
1.8.5		
1.8.6	◆	◆
1.8.7	◆	◆
1.8.8	◆	◆
1.8.9	◆	◆
<b>UNIT 2: MEASUREMENT</b>		
2.8.1		
2.8.2		
2.8.3		
2.8.4		
<b>UNIT 3: DATA ANALYSIS AND PROBABILITY</b>		
3.8.1		
3.8.2		
3.8.3		
3.8.4		
3.8.5	◆	◆
3.8.6	◆	◆

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## CROSS-REFERENCE CHART—GROUP H

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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

## **Mathematics--8/92**

- 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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