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Math for Electricians

Rob Zachariason

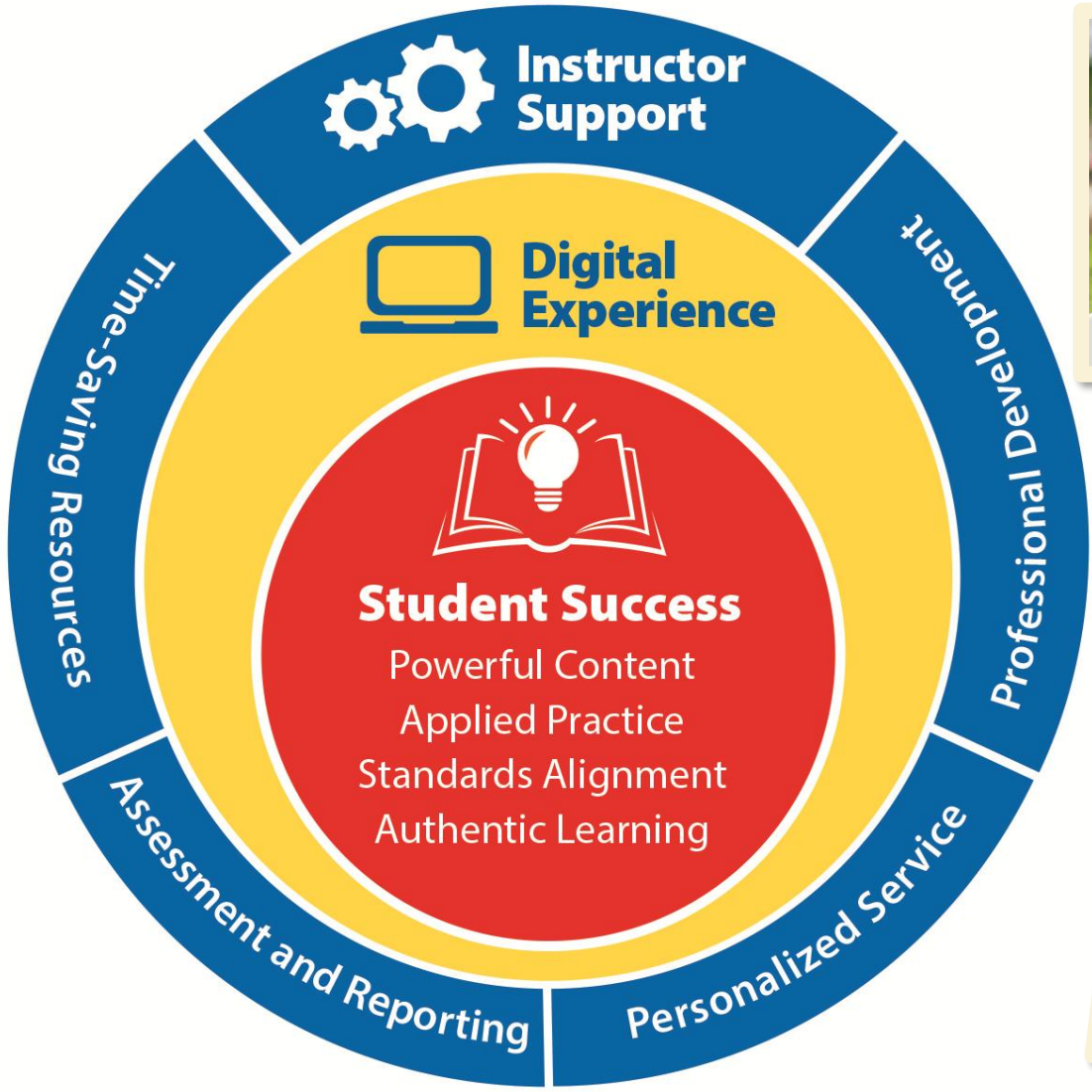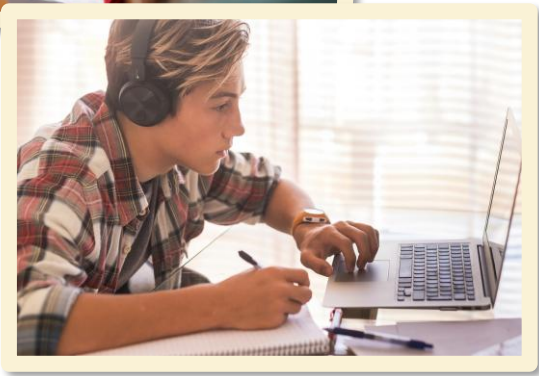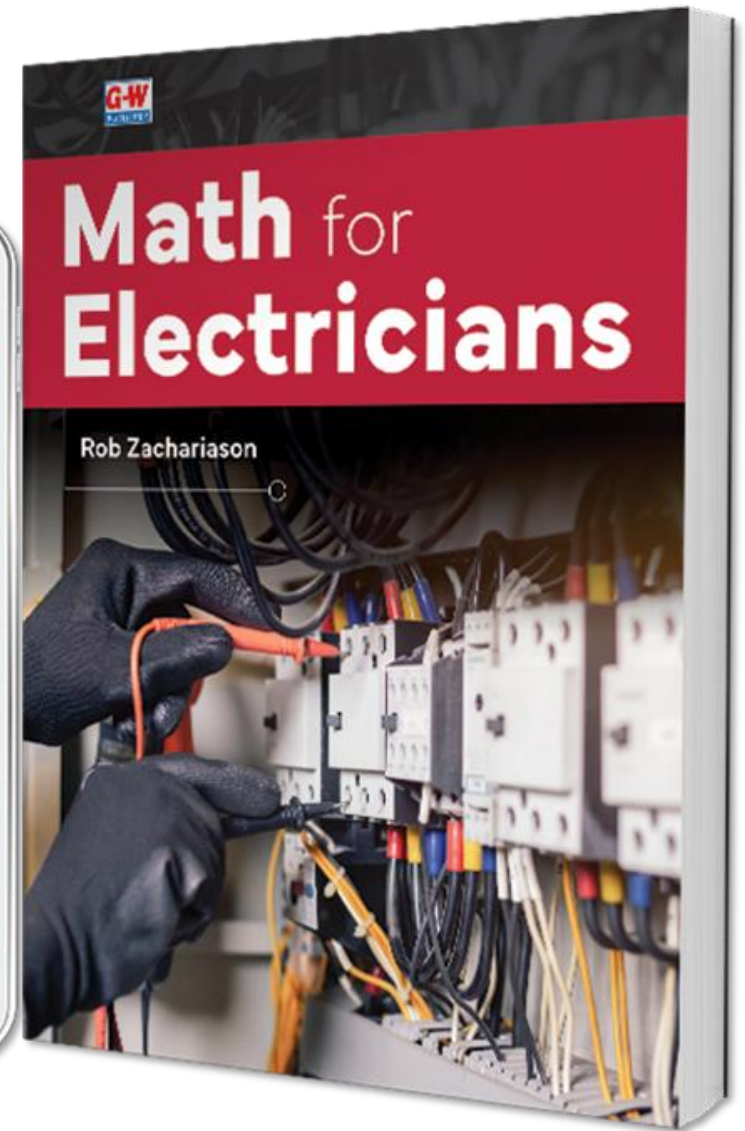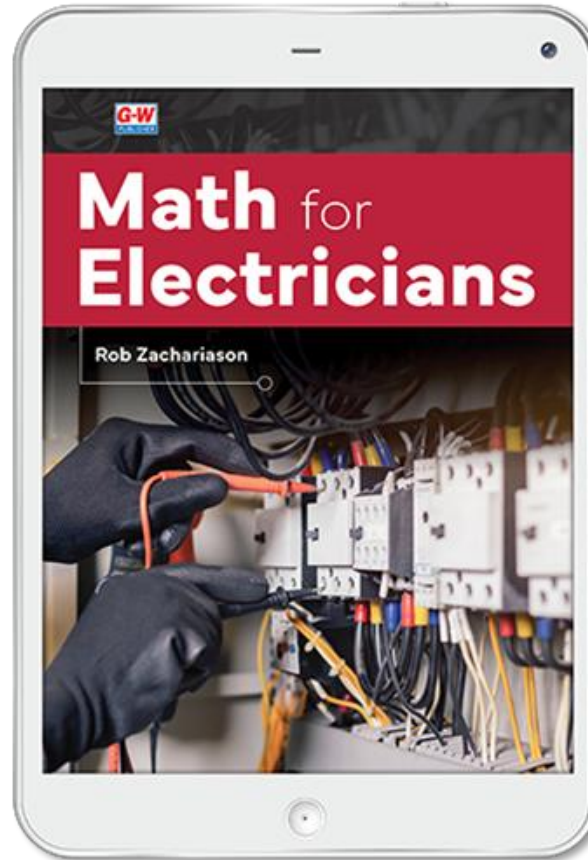*Math for Electricians*, 1st Edition ©2025
by Rob Zachariason

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Construction Careers:
Surveyor/Surveying Technician

- Establish official land boundaries and exact locations
- Must meet education and experience requirements
- Must pass licensing examination
- Work for architectural and engineering firms

Measuring and Recording Respirations (03:46)

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Modern Residential Wiring 13e, Digital Companion

Collapse All

Interactive Glossary

1 Electrical Careers ▾

E-Flash Cards
Matching Activity
Vocabulary Game

1: E-Flash Cards

cable splicer

*Shown are examples across various titles

✓ Prepare for class
✓ Reinforce new concepts
✓ Assess learning

**Ready-to-Implement
Online Instructor Resources**

Lesson Plan: Chapter 2

Instructor: Date:
Course: Period/Section:

Chapter 2: Personal Financial Planning

Section 2.1: Personal Financial Landscape

Objectives

After completing this section, students will be able to:

- Identify steps to develop a budget based on personal goals.
- Explain how to create personal financial statements.
- Discuss the benefits of creating a good recordkeeping system for financial documents.
- Explain how money management software can assist in financial planning.

Terms

- life span
- nature of financial planning
- budget
- spreadsheet
- income
- expense
- fixed expense
- variable expense
- discretionary expense
- pay yourself first
- wealth
- emergency fund
- charity
- social responsibility
- data analysis
- discretionary income
- cash flow statement
- net worth
- asset
- liability
- net worth statement
- liquidity
- recordkeeping
- legal document
- money management softw

Materials

- Foundations of Financial L
- Foundations of Financial L

1

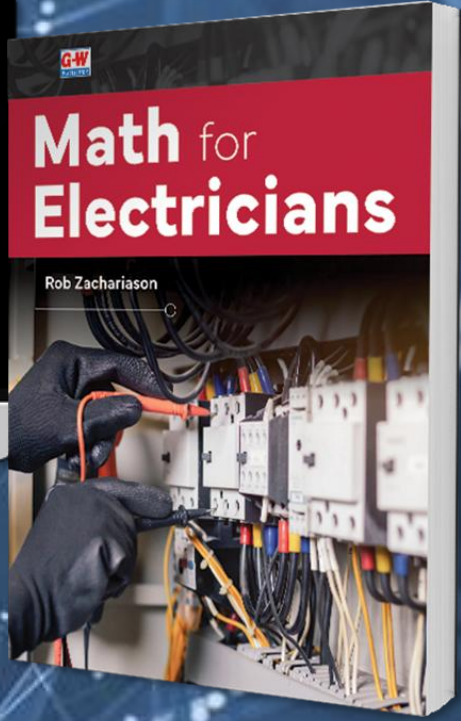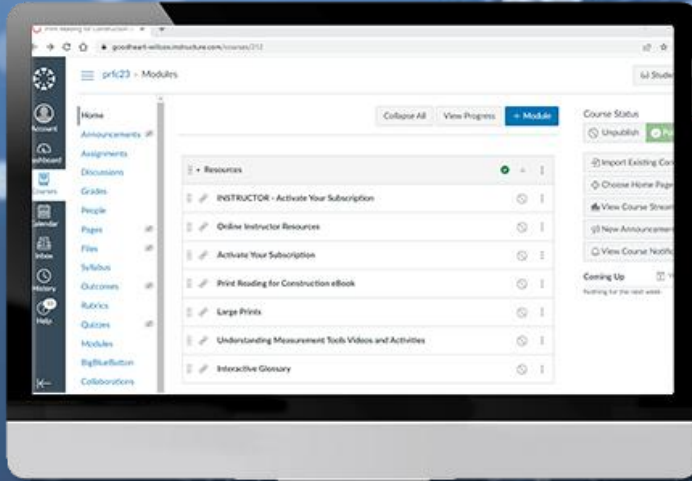**Assessment Software & Question Pools**

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Lesson Plans, Assessments, and Answer Keys

2: E-Flash Cards

Definition (1 of 31)

Item of value that is owned.

2: E-Flash Cards

Term (1 of 31)

Select to flip

asset

◀ Previous   ✕ Remove   Next ▶
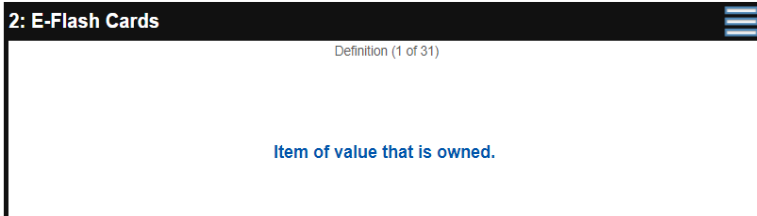
E-Flash Cards & Vocabulary Practice

2: Vocabulary Game

Select a point value. Choose the term that matches the definition.

Score: 800

✓ 100	100	100	100
200	200	200	200
300	✓ 300	300	300
400	400	400	✓ 400

Definition: Act of giving money, goods, or services to meet the needs of others and supporting organizations and causes that are important to an individual.

○ pay yourself first

○ variable expense

○ recordkeeping

✓ philanthropy

Check Answer

Interactive Activities

Chapter 2: Service: The Heart of Hospitality

Instructions: Answer the following questions using what you learned in this chapter.

2.1 Customers Checkpoint

1. The _____ is the main reason for the hospitality industry.
   Answer:

2. The ability to understand how another person feels is _____.
   Answer:

2.2 Providing Quality Service Checkpoint

1. When you provide the same good service and products to customers each time they come to your business, you are providing _____ quality service.
   Answer:

2. *True or False?* Interactions between a customer and a staff member, like a phone conversation to make a hotel reservation, are called *word-of-mouth*.
   Answer:

2.3 Hospitality Employees Checkpoint

1. *True or False?* In a hotel, the back-of-the-house employees include the valets bell attendants, and security officers.
   Answer:

2. A customer-focused employee is able to _____ custom
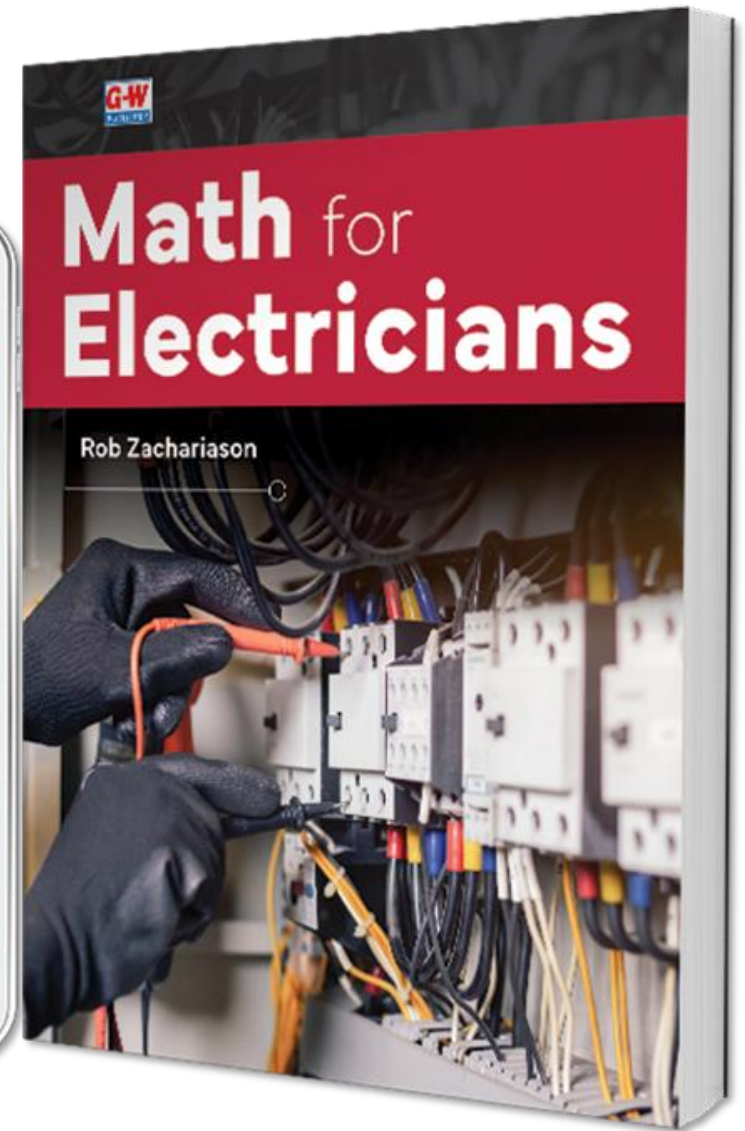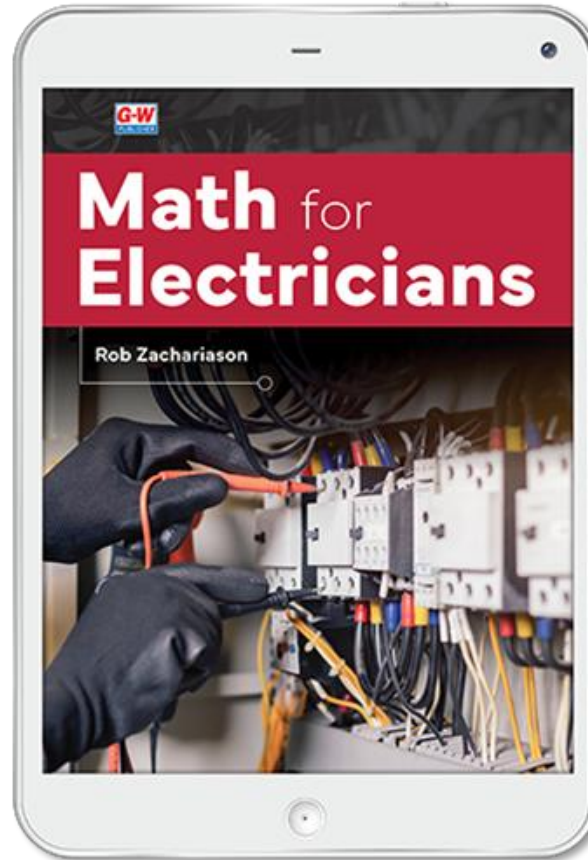   Answer:

Workbook Activities
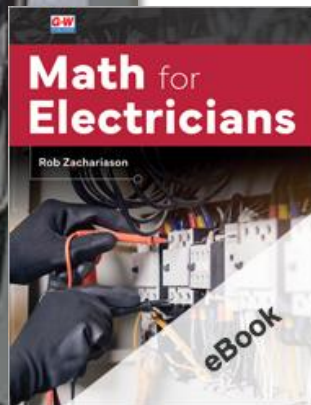
Integrate G-W Digital Resources

*Shown are examples across various titles

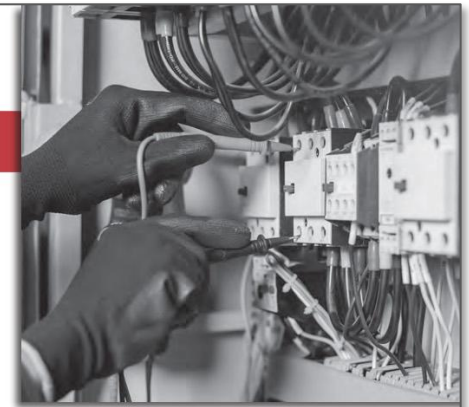*Math for Electricians*, 1st Edition ©2025
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Math for Electricians

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Student Textbook

CHAPTER 1

Whole Numbers

Objectives

Information in this chapter will enable you to:

- Identify how digits and place values are used in positive and negative numbers.
- Compare sets of whole positive and negative numbers and use the greater than, less than, and equals sign symbols.
- Apply rounding to numbers, up or down, as used in cost estimations.
- Calculate addition, subtraction, multiplication, and division of whole numbers.
- Determine the square and cube of a whole number.
- Express both large and small numbers using exponents, powers of ten, and scientific notation.
- Use operations with negative numbers.
- Calculate expressions using the PEMDAS order of operation.

Technical Terms

|			
addition	divisor	order of operation	scientific notation
borrowing	equals sign (=)	place value	square
carried over	exponent	plus sign (+)	subtraction
cube	factor	positive	sum
difference	minus sign (−)	powers of ten	superscript
digit	multiplication	product	
dividend	multiplication sign (×)	quotient	
division	negative	rounding	
division sign (÷)			

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Chapter-Opening Material

An obtuse angle is an angle that measures more than 90° but less than 180°. A straight angle measures exactly 180°.

135°

Obtuse angle

180°

Straight angle
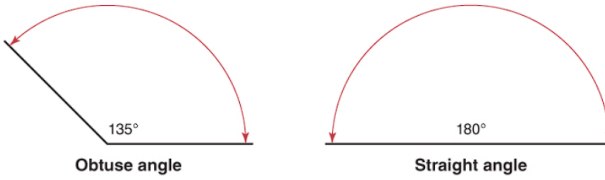
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In geometry, a surface is defined as a two-dimensional plane. An example is *surface area*, which is the surface of the outermost boundary of a three-dimensional object.

←—— Surface
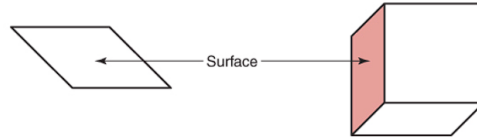
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A polygon is a two-dimensional closed plane with any number of straight sides. See examples of common polygons in the following table:

Name	Triangle	Quadrilateral
Number of Sides	3	4
Shape		

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Trigonometric Chart

Angle	Radian Measure	Sin	Cos	Tan	Angle	Radian Measure	Sin	Cos	Tan
0	0.00000	0.00000	1.00000	0.00000	46	0.80285	0.71934	0.69466	1.03553
1	0.01745	0.01745	0.99985	0.01746	47	0.82030	0.73135	0.68200	1.07237
2	0.03491	0.03490	0.99939	0.03492	48	0.83776	0.74314	0.66913	1.11061
3	0.05236	0.05234	0.99863	0.05241	49	0.85521	0.75471	0.65606	1.15037
4	0.06981	0.06976	0.99756	0.06993	50	0.87266	0.76604	0.64279	1.19175
5	0.08727	0.08716	0.99619	0.08749	51	0.89012	0.77715	0.62932	1.23490
6	0.10472	0.10453	0.99452	0.10510	52	0.90757	0.78801	0.61566	1.27994
7	0.12217	0.12187	0.99255	0.12278	53	0.92502	0.79864	0.60182	1.32704
8	0.13963	0.13917	0.99027	0.14054	54	0.94248	0.80902	0.58779	1.37638
9	0.15708	0.15643	0.98769	0.15838	55	0.95993	0.81915	0.57358	1.42815
10	0.17453	0.17365	0.98481	0.17633	56	0.97738	0.82904	0.55919	1.48256
11	0.19199	0.19081	0.98163	0.19438	57	0.99484	0.83867	0.54464	1.53986
12	0.20944	0.20791	0.97815	0.21256	58	1.01229	0.84805	0.52992	1.60033
13	0.22689	0.22495	0.97437	0.23087	59	1.02974	0.85717	0.51504	1.66428
14	0.24435	0.24192	0.97030	0.24933	60	1.04720	0.86603	0.50000	1.73205
15	0.26180	0.25882	0.96593	0.26795	61	1.06465	0.87462	0.48481	1.80405

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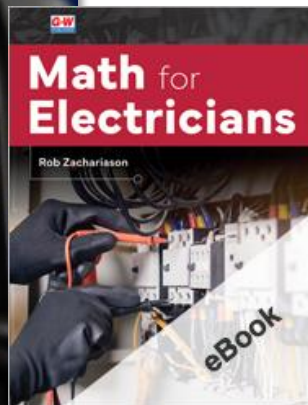
Additional Features

Review Questions

Name _____   Date _____

Mean and Median Values Exercise

Exercise 6-1

Find the mean and median values for each of the following sets of number

1. 12, 27, 11, 41, 87, 1, 5

   Mean: _____
   Median: _____

2. 42, 99, 12, 3, 7

   Mean: _____
   Median: _____

3. 15, 6, 7, 111, 73, 4, 5

   Mean: _____
   Median: _____

4. 582, 345, 213, 12, 89

   Mean: _____
   Median: _____

5. 77, 1, 2, 345, 54, 6

   Mean: _____
   Median: _____

6. 66, 77, 88, 99

   Mean: _____
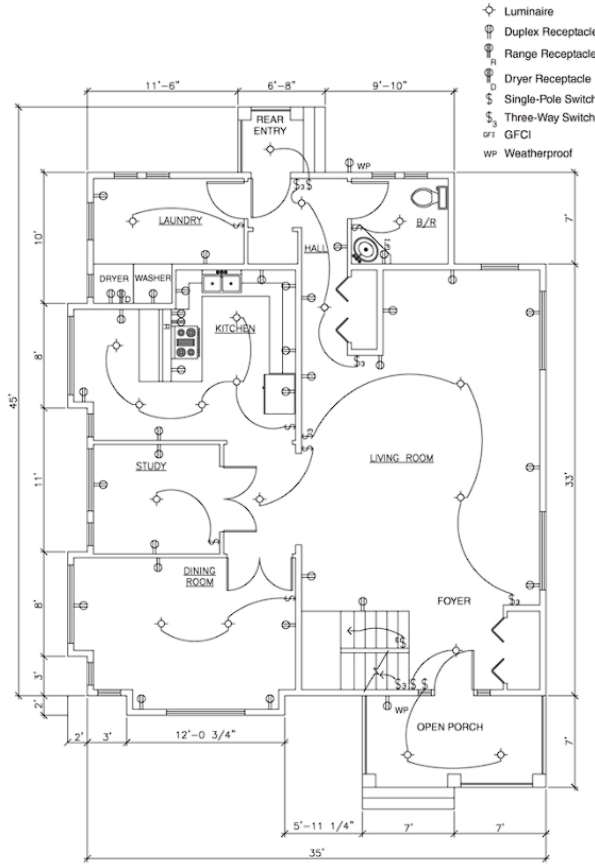   Median: _____

Unknown Value Exercise

Exercise 6-2

Solve the following equations by finding the unknown value. Round ans

1. $X = 3(47 + 2)$

   _____

10.1 Practical Exercises

All of the various mathematical processes explained in this text—from simple arithmetic to complex trigonometry—

◇ Luminaire
Ⓓ Duplex Receptacle
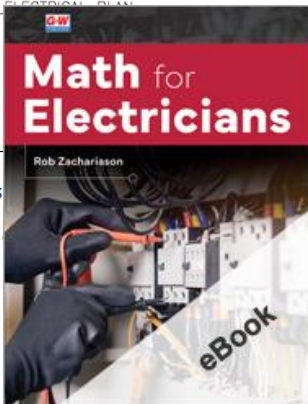Ⓡ Range Receptacle
Ⓓ Dryer Receptacle
$ Single-Pole Switch
$₃ Three-Way Switch
GFI GFCI
WP Weatherproof

11'–6" 6'–8" 9'–10"

REAR ENTRY

LAUNDRY

DRYER WASHER

HALL

B/R

KITCHEN

STUDY

LIVING ROOM

DINING ROOM

FOYER

OPEN PORCH

5'–11 1/4" 7' 7'

2' 3' 12'–0 3/4"

35'

FIRST FLOOR ELECTRICAL PLAN
SCALE: 1/4"

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Description

Practical Exercise 10-1

Name _____   Class _____

An electrical contractor is calculating _____ the electrical plan provided to _____ another floor.

1. Determine the number of lighting

   A. Rear Entry: _____

   B. Laundry: _____

   C. Bathroom: _____

   D. Hall: _____

   E. Kitchen: _____

   F. Living Room:

Practical Exercise 10-4

A contractor received the following invoice from the supplier for materials for a parking lot light installation.

Electrical Supply Company
2501 3rd Ave N
Fargo, ND 58102
(701) 555-1212

Sold to:	Shipped to:
Zach's Electric Inc. 2002 13th Ave S Fargo, ND 58102	Same

Order Date	Date Shipped	Purchase Order #	Account Type	Invoice Date	Terms
5/11	5/27	Z3428	Credit	6/1	1.5% 10 days / Net 30 / 2% added after 30 days

Item #	Quantity	Part #	Mfg.	Desc.	Unit Price	Total
1	12	SSP20	WLO	Light Pole	854.00	10,248.00
2	12	RSX2	Lith	Light Fixture	922.00	11,064.00
3	1	THHN12Bk	SWR	1,000' 12AWG Black	408.00	408.00
4	1	THHN12Rd	SWR	1,000' 12AWG Red	408.00	408.00
5	1	THHN12Gr	SWR	1,000' 12AWG Green	408.00	408.00
6						
7						
8						
9						
10						
Totals	27					$22,536.00

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Description

1. The terms of the invoice state there will be a 1.5% discount applied if the bill is paid within 10 days. If the bill is paid on June 9, what amount should be paid?

   _____

2. A finance charge will be added if the bill is not paid on time. What amount will be due if the bill is paid on July 15?

   _____

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End-of-Chapter Material

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Crosswalk Chart of
Math for Electricians (1st edition), Rob Zachariason
(Goodheart-Willcox Publisher ©2025)
to
Residential Wiring: Concepts and Applications (1st edition), Quinton B. Phillips
(Goodheart-Willcox Publisher ©2024)

This document is intended to help you pair the use of the 1st edition of *Math for Electricians* to the 1st edition of *Residential Wiring: Concepts and Applications*

The following chart provides a basic content correlation between the two textbooks. The left column lists the chapter from the 1st edition of *Math for Electricians* and the right column lists the location of corresponding content in the 1st edition of *Residential Wiring: Concepts and Applications*.

Math for Electricians (1e, 2025)	Residential Wiring: Concepts & Applications (1e, 2024)
Chapter 1—Whole Numbers	Chapter 1—Getting Started in the Industry
	1.6—Electrical Properties and Ohm's Law
	Chapter 18—Branch Circuit/Receptacle Requirements
	18.3—Calculating the Number of Branch Circuits for General-Purpose Receptacles and Outlets
	Chapter 19—Conducting Sizing and Ampacity Adjustments
	19.2—Voltage Drop Calculations
	Chapter 20—Service Calculations
	Chapter 22—Conductor Routing Installation
	22.2—Box Fill Calculations
	Chapter 34—Garage Wiring and Electric Vehicle Charging Power
	34.6—Calculating Loads for Garage Power
Chapter 2—Fractions	Chapter 1—Getting Started in the Industry
	1.6—Electrical Properties and Ohm's Law
	Chapter 20—Service Calculations
	Chapter 23—Conductor Routing and Installation
	Chapter 26—Device and Appliance Trim out
	26.1—Proper Device Terminations
	Chapter 30—Outdoor Lights and Receptacles
	30.2—Exterior Conduits and Cables
	Chapter 35—Standby Power Systems
	35.3—Standby Power Connections

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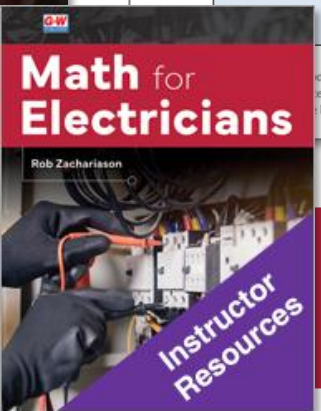🖥 Exam Questions
🖥 Pretest Questions
🖥 Posttest Questions

2 Fractions

2 Resources
📄 Textbook Answer Key
📄 Lesson Plan
2 Presentations
🖥 Instructor's Presentation
🖥 Instructor's Presentation for PowerPoint

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Instructor Resources

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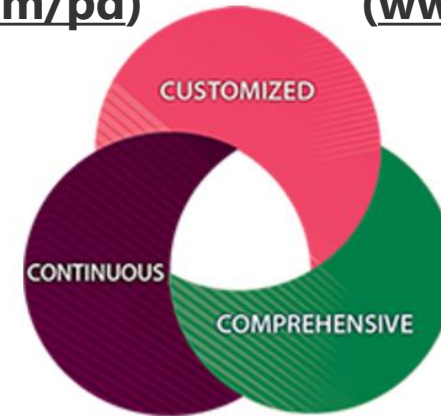
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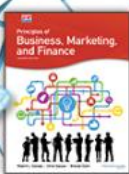**Subject:** Transportation, Distribution, and Logistics

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