

Consumer Math

This course is designed for the student who is challenged by abstract forms of higher math. The course focuses on “real life” processes to teach algebra, geometry, and statistics. The following book is required for this course:

Mathematics Connections Integrated and Applied, by Ashlock, Hatfield, Hausher, and Stoeckinger, Glencoe McGraw-Hill Publishers, 1996

Contents of *Mathematics Connections Integrated and Applied*:

Chapter 1: Applying Numbers and Variables

- Place-Value Football
- 1-1 Place Value
- 1-2 Exponents
- 1-3 Comparing Whole Numbers and Decimals
- 1-4 Rounding Whole Numbers and Decimals
- 1-5 Applications: Using Tax Tables
- 1-6 Estimating Sums and Differences
- 1-7 Estimating Products and Quotients
- On the Job Application: Cashier
- Making Consumer Connections: Bus Schedule
- 1-8 Problem-Solving Strategy: Matrix Logic
- 1-9 Order of Operations
- 1-10 Algebra Connection: Evaluate Expressions
- 1-11 Algebra Connection: Solving Equations Using Addition and Subtraction
- 1-12 Algebra Connection: Solving Equations Using Multiplication and Division
- 1-13 Problem-Solving: Write an Equation
- Review and Testing
- Chapter 1 Review
- Chapter 1 Test
- Making Geography Connections: Time Zones
- Cumulative Review / Test
- Fun With Math

Chapter 2: Patterns: Adding and Subtracting

- Activity: Exploring Decimals with Models
- 2-1 Adding Whole Numbers
- 2-2 Adding Decimals
- 2-3 Subtracting Whole Numbers
- 2-4 Subtracting Decimals
- Computer Application: Terminology
- On the Job Application: Meter Reader
- 2-5 Applications: Checking Accounts
- 2-6 Patterns Connection: Arithmetic Sequences
- 2-7 Problem-Solving Strategy: Choosing the Method of Computation
- 2-8 Geometry Connection Perimeter
- 2-9 Problem-Solving: Identifying the Necessary Facts
- Review and Testing
- Chapter 2 Review
- Chapter 2 Test
- Making Consumer Connections: Budgeting
- Cumulative Review / Test

Chapter 3: Patterns: Multiplying and Dividing

- Activity: Multiplication with Decimal Models
- 3-1 Multiplying Whole Numbers
- 3-2 Multiplying Decimals
- 3-3 Applications: Buying on Credit
- 3-4 Dividing Whole Numbers
- 3-5 Multiplying and Dividing by Powers of Ten
- 3-6 Problem Solving Strategy: Looking for a Pattern
- 3-7 Dividing Decimals
- 3-8 Scientific Notation
- 3-9 Patterns Connection: Geometric Sequences
- 3-10 Algebra Connection: Formulas
- 3-11 Geometry Connection: Area of Rectangles
- 3-12 Statistics Connection: Average (Mean)
- 3-13 Problem Solving: Multi-Step Problems
- Review and Testing
- Chapter 3 Review
- Chapter 3 Test
- Making Science Connections: Noise Pollution
- Cumulative Review / Test
- Fun With Math

Chapter 4: Fractions: Adding and Subtracting

- Activity: Twenty “Decimal” Questions
- 4-1 Factors and Divisibility
- 4-2 Prime Factorization
- 4-3 Greatest Common Factor and Least Common Multiple
- 4-4 Applications: Total Deductions and Take-Home Pay
- 4-5 Equivalent Fractions
- 4-6 Simplifying Fractions
- 4-7 Comparing Fractions
- 4-8 Mixed Numbers
- 4-9 Estimating Sums and Differences
- 4-10 Adding Fractions
- 4-11 Adding Mixed Numbers
- 4-12 Subtracting Fractions
- 4-13 Subtracting Mixed Numbers
- 4-14 Problem Solving Strategy: Make a Drawing
- Review and Testing
- Chapter 4 Review
- Chapter 4 Test
- Making Business Connections: Stocks
- Cumulative Review / Test

Chapter 5: Fractions: Multiplying and Dividing

- 5-1 Estimating Products and Quotients
- 5-2 Multiplying Fractions
- 5-3 Multiplying Mixed Numbers
- 5-4 Applications: Time Cards
- 5-5 Problem Solving Strategy: Simplifying the Problem
- 5-6 Dividing Fractions
- 5-7 Dividing Mixed Numbers
- 5-8 Changing Fractions to Decimals
- 5-9 Changing Decimals to Fractions
- 5-10 Problem Solving: Using Fractions
- Review and Testing
- Chapter 5 Review
- Chapter 5 Test
- Making Consumer Connections: Unit Price
- Cumulative Review / Test
- Fun with Math

Chapter 6: Measurement

- Activity: Create Your Own Measuring System
- 6-1 The Metric System
- 6-2 Measuring Length
- 6-3 Changing Metric Units
- 6-4 Measuring Mass
- 6-5 Measuring Capacity
- 6-6 Problem Solving Strategy: Acting It Out
- 6-7 Customary Units of Length
- 6-8 Customary Units of Weight and Capacity
- 6-9 Algebra Connection: Formulas and Temperature
- 6-10 Measuring Time
- 6-11 Applications: Time Cards
- 6-12 Problem Solving: Using Measurements
- Review and Testing
- Chapter 6 Review
- Chapter 6 Test
- Making History Connections: Nonstandard Units of Weight and Volume
- Cumulative Review / Test

Chapter 7: Geometry

- Activity: Exploring Constructions
- 7-1 Basic Terms of Geometry
- 7-2 Measuring Angles
- 7-3 Classifying Angles
- 7-4 Applications: Congruent Figures and Constructions
- 7-5 Parallel and Perpendicular Lines
- Computer Applications: Introduction to BASIC
- Making Health Connections: Physical Fitness
- 7-6 Polygons
- 7-7 Triangles
- 7-8 Quadrilaterals
- 7-9 Three-Dimensional Figures
- 7-10 Problem Solving Strategy: Use Logical Reasoning
- Review and Testing
- Chapter 7 Review
- Chapter 7 Test
- Making Math Connections: Constructing Triangles
- Cumulative Review / Test
- Fun With Math

Chapter 8: Area and Volume

- Activity: Area of Irregular Figures
- 8-1 Circumference of Circles
- 8-2 Area of Parallelograms
- 8-3 Area of Triangles
- 8-4 Area of Circles
- 8-5 Applications: Installing Carpet
- 8-6 Problem Solving Strategy: Making a Diagram
- 8-7 Surface Area of Rectangular Prisms
- 8-8 Surface Area of Cylinders
- 8-9 Volume of Rectangular Prisms
- 8-10 Volume of Pyramids
- 8-11 Volume of Cylinders
- 8-12 Volume of Cones
- 8-13 Problem Solving: Using Area and Volume
- Review and Testing
- Chapter 8 Review
- Chapter 8 Test
- Making Consumer Connections: Telephone Rates
- Cumulative Review / Test

Chapter 9 : Ratio, Proportion, and Percent

- Activity: Similar Figures
- 9-1 Ratio
- 9-2 Probability Connection: An Introduction to Probability
- 9-3 Probability
- 9-4 Algebra Connection: Solving Proportions
- 9-5 Scale Drawings
- 9-6 Geometry Connection: Similar Figures
- 9-7 Applications: Planning a Trip
- 9-8 Ratios, Percents and Fractions
- 9-9 Percents and Decimals
- 9-10 Problem-Solving Strategy: Guess and Check
- Review and Testing
- Chapter 9 Review
- Chapter 9 Test
- Making Consumer Connections: Gasoline Mileage
- Cumulative Review / Test
- Fun With Math

Chapter 10: Applying Percents

- Activity: Percent
- 10-1 Finding the Percent of a Number
- 10-2 Finding What Percent One Number is of Another
- 10-3 Finding a Number When a Percent of it is Unknown
- 10-4 Problem-Solving Strategy: Using Venn Diagrams
- 10-5 Estimating the Percent of a Number
 - Making Consumer Connections: Sales Tax
 - On-the-Job Application: Sales Representative
- 10-6 Percent of Change
- 10-7 Discount
- 10-8 Interest
- 10-9 Applications: Compound Interest
- 10-10 Problem-Solving: Using Percents
 - Review and Testing
 - Chapter 10 Review
 - Chapter 10 Test
 - Making Consumer Connections: Mail Ordering
 - Cumulative Review / Test

Chapter 11: Statistics and Graphs

- Activity: Averages
- 11-1 Median, Mode, and Range
- 11-2 Frequency Tables
- 11-3 Applications: Misusing Statistics
- 11-4 Bar Graphs
- 11-5 Line Graphs
 - Computer Application: Flowcharts
 - On-the-Job Application: Inventory Specialist
- 11-6 Pictographs
- 11-7 Circle Graphs
- 11-8 Stem-and-Leaf Plots
- 11-9 Measures of Variation
- 11-10 Box-and-Whisker Plots
- 11-11 Problem-Solving Strategy: Look for a Pattern
 - Review and Testing
 - Chapter 11 Review
 - Chapter 11 Test
 - Making Consumer Connections: Misleading Graphs
 - Cumulative Review / Test
 - Fun With Math

Chapter 12: Integers

- Activity: Adding Integers
- 12-1 Integers and the Number Line
- 12-2 Adding Integers
- 12-3 Subtracting Integers
- 12-4 Applications: Wind Chill Factor
 - On-the-Job Application: Catering Manager
 - Making Consumer Connections: Insulation Costs
- 12-5 Multiplying Integers
- 12-6 Dividing Integers
- 12-7 Problem-Solving Strategy: Work Backwards
- Review and Testing
- Chapter 12 Review
- Chapter 12 Test
- Making Consumer Connections: City and State Income Taxes
- Cumulative Review / Test

Chapter 13: Extending Algebra

- Activity: Equations
- 13-1 Solving Equations Using Addition or Subtraction
- 13-2 Solving Equations Using Multiplication or Division
- 13-3 Solving Two-Step Equations
- 13-4 The Coordinate Plane
- 13-5 Graphing Equations
- 13-6 Applications: Reading a Grid Map
- 13-7 Problem-Solving Strategy: Writing an Equation
- Review and Testing
- Chapter 13 Review
- Chapter 13 Test
- Making Social Studies Connections: Latitude and Longitude
- Cumulative Review / Test
- Fun With Math

Chapter 14: Probability

- Activity: Probability and Games
- 14-1 Finding the Number of Outcomes
- 14-2 Probability and Percents
- 14-3 Multiplying Probabilities
- 14-4 Adding Probabilities
- 14-5 Applications: Marketing Research
- 14-6 Odds

- 14-7 Problem-Solving Strategy: Using Samples to Predict
- Review and Testing
- Chapter 14 Review
- Chapter 14 Test
- Making Consumer Connections: Markup
- Cumulative Review / Test
- Fun With Math

Chapter 10

Applying Percents

Do you check for advertised sales on items you buy? Do you watch for special savings on expensive items you would like to buy? Many businesses sell items at a certain percent off during seasonal sales and clearance sales. Businesses also use percents to express profits, losses, discounts, commissions, and interest.

Shirley Brobeck sells sweatshirts for Harper's Sweatshirts. In addition to her salary, she earns 2% of the retail price of any goods she sells. These earnings, based on sales, are called a commission. How much commission does Mrs. Brobeck earn for selling \$189 worth of sweatshirts?

Activity: Percent

In this activity you will find the percent of a number. Suppose you surveyed your class to find the number of students who rented a video tape last week. Of the 100 students surveyed, 33 students said they rented a video tape last week. What percent of the students rented a video tape?

Materials: 10 x 10 grids, colored pencil (optional)

Work together in groups of three or four.

1. Shade 33 squares on a 10 x 10 grid. Write a fraction with a denominator of 100 that represents the shaded part of the grid.
2. Percents are ratios that compare numbers to 100. The word *percent* means per 100 or hundredths. The percent symbol (%) means that a number is being compared to 100. If 33 out of 100 students had rented a video last week, write the percent of students who had rented a video using the percent symbol (%).
3. Percents can be expressed as fractions without the percent symbol. Look at the fraction you wrote in Exercise 1. What is the fraction in simplest form? How would you write this fraction as a decimal?
4. Numbers can be expressed as a percent, as a fraction, as a decimal, and as a ratio. Write the number of students who rented a video tape in the last week in four ways. Each of the four ways represents the same percent.
5. Shade 46 squares on a 10 x 10 grid. Write the number of shaded squares as a fraction, a decimal, a ratio, and as a percent.
6. Decide with your group how to express 1 out of 100 and 0.5 out of 100 as a fraction, a decimal, and a percent.

7. Decide with your group how to express 2,000 out of 100 as a fraction, a decimal, and a percent.
8. Suppose you read an article that says the cost of oranges will be 240% of the usual price because of frost in Florida. With your group, write a sentence describing the increase in the cost of oranges.

You will study more about percent in this chapter.

10.1 Finding the Percent of a Number

Amanda has been shopping for a combination radio/tape player. She found the one she likes on sale at 40% off the regular price. If the radio usually sells for \$90, how much would Amanda save if she buys the radio on sale? To answer the question, find 40% of \$90.

To find the percent of a number, multiply the number by the percent. The equation below shows the relationship between the percent or rate r , the number or base b , and the percentage p .

$$\begin{array}{l} \text{rate} \times \text{base} = \text{percentage} \\ r \times b = p \end{array} \quad \text{The percent of a number is called a percentage.}$$

- Method
1. Write the percent as a fraction or decimal.
 2. Multiply the base by the decimal or fraction.

A. How much will Amanda save? Find 40% of \$90.

1. $40\% \rightarrow 0.40$
 2. $0.40 \times 90 = 36$
- Amanda will save \$36.

B. Find 105% of 72.

1. $105\% \rightarrow 1.05$
 2. $1.05 \times 72 = 75.60$
- 105% of 72 is 75.6.

It is easier to change some percents to fractions rather than decimals. Some convenient facts are given in the table at the right.

$25\% = \frac{1}{4}$	$33\frac{1}{3}\% = \frac{1}{3}$	$20\% = \frac{1}{5}$	$12\frac{1}{2}\% = \frac{1}{8}$
$50\% = \frac{1}{2}$	$66\frac{2}{3}\% = \frac{2}{3}$	$40\% = \frac{2}{5}$	$37\frac{1}{2}\% = \frac{3}{8}$
$75\% = \frac{3}{4}$		$60\% = \frac{3}{5}$	$62\frac{1}{2}\% = \frac{5}{8}$
		$80\% = \frac{4}{5}$	$87\frac{1}{2}\% = \frac{7}{8}$

C. Find $33\frac{1}{3}\%$ of 45.

$$1. 33\frac{1}{3}\% = \frac{1}{3}$$

$$2. \frac{1}{3} \times 45 = \frac{1}{3} \times \frac{45}{1} = 15$$

10.2 Finding What Percent One Number is of Another

Josh is buying a skateboard. The one he likes was originally priced for \$120. The sale price is \$90. \$90 is what percent of the original amount?

In this problem you need to find the rate. To find the rate (the percent) when the base \$120 and percentage \$90 are known, use the equation $r \times b = p$ and solve for r .

Method 1. Write the equation $r \times b = p$.
2. Solve for r .

A. What percent of \$120 is \$90?

$$1. r \times 120 = 90$$

$$2. r = 90 \div 120 = 0.75 \text{ or } 75\%.$$

\$90 is 75% of \$120.

B. 80 is what percent of 64?

$$1. r \times 64 = 80$$

$$2. r = 80 \div 64 = 1.25 \text{ or } 125\%$$

80 is 125% of 64.

10.3 Finding a Number When a Percent of it is Known

After softball season, Stacy's coach told her that she got a hit 40% of the times she was at bat. If she had 48 hits, how many times was Stacy at bat? You need to find the number of which 48 is 40%.

To find a number when a percent of it is known, use $r \times b = p$ and solve for b .

Method 1. Write the percent as a decimal or fraction.
2. Write the equation using the variable b for the base.
3. Solve for b .