Consumer Math

ENROLLED STUDENTS ONLY

This course is designed to enhance understanding of basic, practical math applications. The course focuses on “real life” processes such as budgeting, compound interest, sales tax, small business management, and data processing to teach algebra, geometry, and statistics.

The following books are needed for this course:

*Mathematics Connections Integrated and Applied* (Glencoe)

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 $p$.

\[
rate \times base = percentage \\
\[
\]

\[
\frac{r \times b}{p} = \]

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% → 0.40
   2. 0.40 x 90 = 36
      Amanda will save $36.

B. Find 105% of 72.
   1. 105% → 1.05
   2. 1.05 x 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.

<table>
<thead>
<tr>
<th>Percent</th>
<th>Fraction</th>
</tr>
</thead>
<tbody>
<tr>
<td>25%</td>
<td>¼</td>
</tr>
<tr>
<td>50%</td>
<td>½</td>
</tr>
<tr>
<td>75%</td>
<td>¾</td>
</tr>
<tr>
<td>33 1/3%</td>
<td>¼</td>
</tr>
<tr>
<td>66 2/3%</td>
<td>⅓</td>
</tr>
<tr>
<td>20%</td>
<td>⅕</td>
</tr>
<tr>
<td>40%</td>
<td>⅒</td>
</tr>
<tr>
<td>60%</td>
<td>⅗</td>
</tr>
<tr>
<td>80%</td>
<td>⅘</td>
</tr>
<tr>
<td>12 1/2%</td>
<td>⅛</td>
</tr>
<tr>
<td>37 1/2%</td>
<td>⅞</td>
</tr>
<tr>
<td>62 1/2%</td>
<td>⅞</td>
</tr>
<tr>
<td>87 1/2%</td>
<td>⅞</td>
</tr>
</tbody>
</table>
C. Find 33\(\frac{1}{3}\)\% of 45.

1. \(33\frac{1}{3}\% = \frac{1}{3}\)
   \(\frac{1}{3} \times 45\)
2. \(\frac{1}{3} \times 45 = 15\)

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. \(r = \frac{90}{120} = 0.75\) or 75%.
   $90 is 75% of $120.

B. 80 is what percent of 64?
   1. \(r \times 64 = 80\)
   2. \(r = \frac{80}{64} = 1.25\) 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 \(b\).