Math Academy

Dining Out!

Explorations in Fractions, Decimals, & Percents

The Actuarial Foundation
A Letter from the Author

Congratulations! You’ve just found your answer to the question, “What can I do to create real enthusiasm for mathematics in all my students?”

Created by teachers for teachers, the Math Academy tools and activities included in this booklet were designed to create hands-on activities and a fun learning environment for the teaching of mathematics to our students. On Math Academy days I often found that I couldn’t make it from my car to my classroom without being stopped by enthusiastic students wanting to know every detail of the upcoming day’s events. Math Academy days contributed to a positive school-wide attitude towards mathematics on our campus.

This booklet contains the Math Academy – Dining Out! Explorations in Fractions, Decimals, and Percents, which you can use to enhance your math instruction while staying true to the academic rigor required by the state standards framework.

This effort would not have been possible without support from The Actuarial Foundation.

I sincerely hope that you enjoy implementing the Dining Out! Math Academy with your students. When you do, you will find that your students engage with mathematics on a whole new level. The Actuarial Foundation is truly a great partner in furthering mathematics education!

For the kids!

Kimberly Rimbey, M.Ed., NBCT (Math)
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What is a Math Academy?

When the Math Academy concept was first developed, it was designed as a half-day or full-day event which allowed students to deepen their understanding of math while interacting with volunteers from the community (see page 24 for ideas on working with community volunteers). The activities we selected for these events were hands-on, standards-based lessons which applied mathematical principles in real-world scenarios. Each student experienced three to five activities during the course of the event.

Each Math Academy began with a brief school assembly featuring a guest speaker who represented that day’s particular theme. Themes included math related to restaurants, sports, nature, shopping, fine arts and other topics, as well as focused on math-related careers. After the assembly, students rotated to different classrooms where they engaged in various activities related to mathematics and the day’s coordinating theme.

Included in this booklet is the *Math Academy – Dining Out! Explorations in Fractions, Decimals, and Percents*, which has all the activities we used for the restaurant Math Academy. This Math Academy is designed to help students understand how to use fractions, decimals, and percents in the context of restaurants and money. In this day of credit and gift cards, children do not have as many real-life opportunities to count money and make change. These activities will keep those skills fresh, even with older students.

You may choose to implement a grade-level or school-wide Math Academy as we originally designed it, or you may prefer to implement these activities in your own classroom. Whichever format you use, keep in mind that the goal is to help your students see the relevance of mathematics in real-life contexts.
Getting Started

Math Academy Format
You may choose to conduct your Math Academy as a school-wide event, as a grade-level rotation, or as a single-classroom experience. If you will be holding your Math Academy for a single classroom, you may want to invite a guest speaker to speak with your class about how mathematics is used in his/her job (rather than putting on a school-wide or grade-level assembly as described below).

Math Academy Schedule
*Schedule and times may vary depending on format being used.*

- Opening assembly (optional) — 15 minutes
- Directions and Math Journals — 15 minutes
- Activity Rotations — 30–45 minutes per activity
- Assessment and Closure — 15 minutes

Introduction
Announce to the students that today they will be working with menus, money, and discounts. Everyone loves to eat out, and knowing how to figure tips, tax, and discounts is part of the experience — especially when it means you’ll save money! Explain to them that during this Math Academy, they will be visiting four different restaurants, and at each one, they will use the menus to complete the activities. The skills of using fractions, decimals, and percents will be very important throughout all of these “dining out” experiences.

Guest Speaker Presentation (optional)
Beforehand, arrange for someone in the restaurant business to talk to the students about the mathematics found in a restaurant (they may or may not connect to fractions, decimals, and percents, but encourage them to do so). Possible guest speakers may include a chef, a waiter, a restaurant owner, or a culinary instructor. One school had a chef do a cooking demonstration for 300 students — and he brought samples for everyone! Although this guest speaker will primarily be focused on the restaurant aspect of this Math Academy theme, you may want to work with him/her ahead of time to assist with including mathematical ideas in the talk.

Theme
Dining Out: Understanding Fractions, Decimals, and Percents When Eating Out

Objective
Understand and apply concepts of fractions, decimals, and percents to count money, make change, figure tax/tips, and participate in other restaurant-related activities
Getting Started (continued)

Use of Math Journals

Students record their findings in their “Math Journals” during each activity. These journals should contain all recording sheets for the activities as well as blank paper for the extension activities. Before beginning the Activities Rotation, students should spend about 10 minutes writing in their math journals, including their reflections from the assembly as well as briefly describing what they already know about fractions, decimals, and percents.

Activities Rotation

If multiple classes are participating in the Math Academy, each classroom should host a different activity so students will rotate from classroom to classroom in order to complete each activity. If only one class is participating, the students may rotate from one activity to the next around the room, or they may do each activity as a whole class, one game after the other. Activities begin on page 7. For best results, plan on three to five activities for your Math Academy.

Note: There are no teacher answer keys in this particular booklet since all activities are open-ended and answers will vary

Closure and Assessment

Once all activities are completed, the students may return to their homeroom classes for final reflections and assessment. See pages 21 and 22 for sample post quiz and survey.

Key Vocabulary

- Fractions
- Numerator
- Denominator
- Equivalent
- Decimal
- Sales
- Tax
- Gratuity
- Tenths
- Hundredths
- Percent

TEACHER TIPS: CUSTOMIZING THESE ACTIVITIES

- Use the “Procedures” section in each activity as a skeleton for the lesson.
- Look through the “Suggestions for Customizing This Activity” section.
- Select the suggestion(s) which best fits with the concepts on which you want your students to focus.
Math Academy Manipulatives: Money

The activities in this booklet recommend the use of plastic coins and paper bills for counting money and making change. If plastic coins and paper bills are not readily available, the pieces below may be photocopied and cut apart for classroom use.
Math Academy Manipulatives: *Coupons*

Copy the coupons below. Cut apart to be used with the Activities.

<table>
<thead>
<tr>
<th>20% off entire order</th>
<th>20% off entire order</th>
<th>20% off entire order</th>
<th>20% off entire order</th>
</tr>
</thead>
<tbody>
<tr>
<td>25% off entire order</td>
<td>25% off entire order</td>
<td>25% off entire order</td>
<td>25% off entire order</td>
</tr>
<tr>
<td>1/3 off entire order</td>
<td>1/3 off entire order</td>
<td>1/3 off entire order</td>
<td>1/3 off entire order</td>
</tr>
<tr>
<td>50% off entire order</td>
<td>50% off entire order</td>
<td>50% off entire order</td>
<td>50% off entire order</td>
</tr>
</tbody>
</table>
Math Academy Activity 1: Joe’s Place

Objective  
Younger students will select items from a menu and count out the total amount needed using the fewest bills & coins possible. Older students will determine fractions, decimals, and percents of the items ordered and/or figure percent/fraction discounts based on coupons. Older students may use the optional “fraction” menu as well, which will encourage them to connect fractions and decimals in the context of money.

Materials  
- Menus (photocopy page 10)
- Money trays
- Play Money (see page 7)
- Order Form (photocopy page 11)
- Optional: Coupons (see page 8)

Procedures  
1. Students use the menu to determine what they will be “ordering”. They should write down their food choices and the cost, on the appropriate order form.
2. Students determine the total amount to pay and record on the order form.
3. Students pay for the meal using the least number of bills & coins possible.

Suggestions for Customizing This Activity

Younger Students:
- Ask students to record how they would pay for their meals using the fewest number of bills/coins (record on money combination form).
- Have students use the order form that does not include tax or tip.
- After students determine their individual totals and count out the bills/coins, have students combine their totals by putting all of their bills/coins together. Next, have students “trade” bills/coins to be sure they have the fewest bills/coins possible while maintaining the correct total.

All Students:
- Ask students to select their items and determine the total as individuals or as a group.
- Ask students to use the second menu as a unique way for them to determine the relationship between fractions and money.
- Give the students coupons to use after they have determined the total cost of their meals. These coupons may be for 20%, 25%, ½, or 50% off the total cost of the meal. Of course, they will have to re-figure the tax and tip if that was part of their assignment.
Math Academy Activity 1: Joe’s Place

Suggestions for Customizing This Activity (cont’d)

Older Students:
• Ask students to determine the total order including 10% tax and 15% tip
• Ask students to determine the total order including the tax and tip structures for the city/state where they live.
• Ask students to determine the total for a catered party. For this option, they must decide upon a menu and then multiply the cost of each item times the number of guests they expect. This option must also include tax and gratuity (gratuity is typically 20%).
• Ask students to use mental math strategies to figure tax, tips, and/or coupon discounts.

Joe’s Place — Menu #1

<table>
<thead>
<tr>
<th>Item</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hamburger</td>
<td>$4.75</td>
</tr>
<tr>
<td>Chicken Sandwich</td>
<td>$4.75</td>
</tr>
<tr>
<td>Caesar Salad</td>
<td>$5.50</td>
</tr>
<tr>
<td>Cheese Crisp.</td>
<td>$3.25</td>
</tr>
<tr>
<td>Soup</td>
<td>$3.10</td>
</tr>
<tr>
<td>French Fries</td>
<td>$1.90</td>
</tr>
<tr>
<td>Onion Rings</td>
<td>$2.25</td>
</tr>
<tr>
<td>Fruit Plate.</td>
<td>$2.50</td>
</tr>
<tr>
<td>Fresh Vegetables</td>
<td>$2.50</td>
</tr>
<tr>
<td>Soda</td>
<td>$1.50</td>
</tr>
<tr>
<td>Iced Tea</td>
<td>$1.50</td>
</tr>
<tr>
<td>Coffee</td>
<td>$0.75</td>
</tr>
<tr>
<td>Latte</td>
<td>$3.80</td>
</tr>
<tr>
<td>Milk Shake</td>
<td>$3.25</td>
</tr>
<tr>
<td>Sundae</td>
<td>$4.25</td>
</tr>
<tr>
<td>Pie</td>
<td>$3.75</td>
</tr>
</tbody>
</table>

Joe’s Place — Menu #2

<table>
<thead>
<tr>
<th>Item</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hamburger</td>
<td>$4 ¾</td>
</tr>
<tr>
<td>Chicken Sandwich</td>
<td>$4 ¾</td>
</tr>
<tr>
<td>Caesar Salad</td>
<td>$5 ½</td>
</tr>
<tr>
<td>Cheese Crisp.</td>
<td>$3 ¼</td>
</tr>
<tr>
<td>Soup</td>
<td>$3 1/10</td>
</tr>
<tr>
<td>French Fries</td>
<td>$1 9/10</td>
</tr>
<tr>
<td>Onion Rings</td>
<td>$2 ¼</td>
</tr>
<tr>
<td>Fruit Plate.</td>
<td>$2 ½</td>
</tr>
<tr>
<td>Fresh Vegetables</td>
<td>$2 ½</td>
</tr>
<tr>
<td>Soda</td>
<td>$1 3/10</td>
</tr>
<tr>
<td>Iced Tea</td>
<td>$1 ½</td>
</tr>
<tr>
<td>Coffee</td>
<td>$0 ¾</td>
</tr>
<tr>
<td>Latte</td>
<td>$3 5/8</td>
</tr>
<tr>
<td>Milk Shake</td>
<td>$3 ¼</td>
</tr>
<tr>
<td>Sundae</td>
<td>$4 ½</td>
</tr>
<tr>
<td>Pie</td>
<td>$3 ¾</td>
</tr>
</tbody>
</table>
Math Academy Activity 1: Joe’s Place

Joe’s Place — Order Form #1

<table>
<thead>
<tr>
<th>#</th>
<th>Item(s)</th>
<th>Item Cost</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total:

Joe’s Place — Order Form #2

<table>
<thead>
<tr>
<th>#</th>
<th>Item(s)</th>
<th>Item Cost</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sub-Total:

Tax:

Tip:

TOTAL:

Joe’s Place — Money Combination Form

How did you make your total amount using the fewest coins and bills possible?

<table>
<thead>
<tr>
<th>Coins</th>
<th>How Many?</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pennies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nickels</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dimes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quarters</td>
<td></td>
<td></td>
</tr>
<tr>
<td>One-dollar bills</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Five-dollar bills</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ten-dollar bills</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Twenty-dollar bills</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total:
Math Academy Activity 2: The Snack Shop

Objective
Younger students will count out the total amount of money needed to purchase trail mix using the fewest number of bills/coins possible. Older students will determine fractions, decimals, and percents of the items ordered and/or figure percent/fraction discounts based on coupons.

Materials
- Play Money (see page 7)
- Money trays
- Dice
- The Snack Shop Recording sheet (photocopy page 13)
- Optional: Trail Mix food, bowls, spoons, ziplock bags

Procedures
1. Show students the Trail Mix menu and explain that they will be going through The Snack Shop to make trail mix.
2. Students may take a total of 5 scoops — Each student rolls a die five times to determine which items and how many scoops of each to take. Students determine the total cost of the selections and fill out the recording sheet accordingly.
3. Students must pay for the Trail Mix using exact change in the least number of bills/coins possible.
4. Optional: Students scoop real trail mix into ziplock bags, mix, and eat.

Suggestions for Customizing This Activity

All Students:
- Change the value of the scoops as needed.
- Change the number of scoops they may take (especially for older students who may be figuring the fractions, decimals, and percents for each item).
- Have the children determine the change they would receive if they paid with a $20 bill.

Older Students:
- Ask the students to determine the fraction, decimal, and percent equivalents for each item they included.
- Require students to make a circle graph and record the percent for each item they selected for their trail mix.
- Hand out coupons and have students figure out the actual price after taking off the coupon amount (20%, 25%, 1/3 or 50% off – see page 8).
- Have students use mental math strategies to figure percents.
- Have students determine the tax based on their state/city tax scale; or have them estimate tax with a round number (e.g., 5% or 10%).
Math Academy Activity 2: The Snack Shop

The Snack Shop Recording Sheet
Today you are making Trail Mix at The Snack Shop. Use the menu to find out how much each scoop costs. Record your data below.

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raisins (1 scoop)</td>
<td>$0.88</td>
</tr>
<tr>
<td>Peanuts (1 scoop)</td>
<td>$1.25</td>
</tr>
<tr>
<td>M &amp; M’s (1 scoop)</td>
<td>$1.49</td>
</tr>
<tr>
<td>Goldfish (1 scoop)</td>
<td>$0.95</td>
</tr>
<tr>
<td>Pretzels (1 scoop)</td>
<td>$1.09</td>
</tr>
<tr>
<td>Your choice (any item above)</td>
<td></td>
</tr>
</tbody>
</table>

Total Cost:

How can you make that amount using the fewest number of coins/bills possible?

<table>
<thead>
<tr>
<th>Coins</th>
<th>How Many?</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pennies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nickels</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dimes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quarters</td>
<td></td>
<td></td>
</tr>
<tr>
<td>One-dollar bills</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Five-dollar bills</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total:
Math Academy Activity 3: \textit{The Corner Diner}

**Objective**
The students will count mixed bills/coins and record correctly using the symbols “¢” or “$”. Older students will use mental math strategies to add bill/coin values and to determine percentages.

**Materials**
- Play Money (see page 7)
- Money trays
- The Corner Diner Recording Sheet (photocopy page 15)

**Procedures**

1. Explain to students that in The Corner Diner, the value of each food item will be determined by the letters in the name of that food.

2. Go over the “What’s the Value” chart which explains that vowels = 25¢, consonants b – n = 5¢, and consonants p – z = 10¢ (or whatever value structure you choose to use – see customizing options below).

3. Distribute the “menu” and have students use bills & coins to determine the cost of each menu item.

4. Students should record the value of each item as well as draw the bills/coins.

5. The last 2 spaces are for the students to select their own menu items. If time permits, they can add to their menus on the back side.

6. **Optional:** Students can trade bills/coins to make the value using the least number of bills/coins possible (e.g., trade 4 quarters for a dollar, trade 2 nickels for a dime, trade 2 dimes & a nickel for a quarter, etc.)

**Suggestions for Customizing This Activity**

- **All Students:**
  - Rather than using the value sheet included on the next page, ask the students to determine prices based on the following structure: \( A = 1¢, B = 2¢, C = 3¢, D = 4¢, \) and so on.

- **Older Students:**
  - Ask students to use mental math rather than using bills/coins.
  - After finding the value of each item on the menu, ask students to convert the menu into a “fraction menu” as found in the first activity in this booklet (Joe’s Place, Menu #2). All fractions should be listed in lowest terms.
  - Ask students to create “discount menus” or “profit menus” after finding the value of each item.
    - Discount Menu: What would the menu prices be if each price were reduced by 25% (or any percent) in order to draw in more customers?
    - Profit Menu: What would the menu prices be if each price were increased by 50% (or any percent) in order to increase profits?
# Math Academy Activity 3: The Corner Diner

## The Corner Diner Recording Sheet

<table>
<thead>
<tr>
<th>Hamburger</th>
<th>Cheeseburger</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pizza</th>
<th>French Fries</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pie</th>
<th>Cake</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## What’s the Value? Menu

- **Vowels** = 25¢
  - (a, e, i, o, u)

- **Consonants**:
  - **b – n** = 5¢
    - (b, c, d, f, g, h, j, k, l, m, n)
  - **p – z** = 10¢
    - (p, q, r, s, t, v, w, x, y, z)
Math Academy Activity 4:  
The Menu Game at The Terribly Terrific Taco

Objective  
The students will figure discounts and/or profit increases for various food totals. Students will add decimals to $100.

Materials  
- *The Terribly Terrific Taco* Menus (photocopy page 17)  
- Game board (photocopy pages 18–19)  
- Game cards (photocopy page 20)  
- Game spinner and paper clip for each team (photocopy page 17)  
- Game pieces (one for each player)  
- Scratch paper  
- **Optional:** plastic or paper coins and paper bills (see page 7 if using photocopies)

Procedures  
1. All players place game pieces on “START”. Place cards, face down, in the center of the game board.  
2. Player 1 spins the paper clip on the spinner and moves that many spaces in either direction.  
3. Player 1 takes the top card and reads it out loud.  
4. All players find the total on the card and apply the discount/increase on the game board to the order on the card. This total belongs to Player 1, but all players do the operation to check his/her work.  
5. Player 1 records his/her total on scratch paper.  
6. Players take turns repeating steps 2 – 5.  
7. On subsequent turns, players roll the die and move that many spaces in either direction, beginning at the space they landed on for the previous turn. Then they add the new total to the previous total. The first player to reach $50 wins the game. (Note: If a player lands on “Start” again, s/he simply records the total from the game card s/he draws.)

Suggestions for Customizing This Activity  
**Younger Students:**  
- Have students use game board 1.  
- Alter the game board so that fractions, decimals, and/or percents fit the level of the students.  
- Alter the winning amount to shorten or lengthen game time.  
- Ask student to use coins and bills to determine amounts.
Math Academy Activity 4: 
The Menu Game at The Terribly Terrific Taco

Suggestions for Customizing This Activity

Older Students:
- Have students use game board 2 (advanced).
- Ask students to do mental math rather than use coins and bills.
- Ask students to figure tax and/or tip to determine the total for each turn (provide the percentages you want them to use – e.g., 15% for tip and 10% for tax if using mental math; also, tell them beforehand if they are to add the tax and tip before or after the game board operation is applied).
- Alter the menu prices to fit with the skill-level of your students.
- Allow students to use calculators if working on technology objectives.

The Terribly Terrific Taco Menu

**Ala Carte Menu**
- Tostada . . . . . . . . . . . . . . . . . . . . . . $1.50
- Taco . . . . . . . . . . . . . . . . . . . . . . . . $1.50
- Enchilada . . . . . . . . . . . . . . . . . . . . $2.00
- Burrito . . . . . . . . . . . . . . . . . . . . . . . $4.00
- Soda . . . . . . . . . . . . . . . . . . . . . . . . . $1.50
- Ice Cream . . . . . . . . . . . . . . . . . . . . . . $2.25

**Value Menu**
- #1 – 1 Tostada, 1 Taco, 1 Soda . . . . . . . . $4.25
- #2 – 2 Enchiladas, 1 Soda . . . . . . . . . . . . $5.25
- #3 – 1 Tostada, 1 Burrito, 1 Soda . . . . . $7.50

**Family Value Menu**
- 4 Burritos, 4 Tacos, 4 Sodas . . . . . . . . $25.00
Math Academy Activity 4:  
The Terribly Terrific Taco Game Board 1

- Add $2.25  
- Take off $1.25  
- Take off 100%  
- Take off 20%  
- Add 100%  
- Take off half  
- Subtract 50%  
- Subtract $1.50  
- Take off 10%  
- Add $3.50  
- Add 50%  
- Add $0.75  
- Take off $0.75  
- Add $0.75  
- Add $2.25  
- Take off 1/2  
- Take off $1.25  
- Take off 100%  
- Take off 20%  
- Add 100%
Math Academy Activity 4:  
The Terribly Terrific Taco Game Board 2—Advanced

Place Game Cards Here (Face Down)
Math Academy Activity 4: The Terribly Terrific Taco Game Cards

<table>
<thead>
<tr>
<th>Description</th>
<th>Total Bill:</th>
<th>Total Bill:</th>
<th>Total Bill:</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>You ordered: Value Meal #2 Value Meal #3</td>
<td>$8.53</td>
<td>$7.87</td>
<td></td>
<td>You ordered: Family Value Meal</td>
</tr>
<tr>
<td>You ordered: 1 Tostada 1 Taco</td>
<td>$5.05</td>
<td></td>
<td>$17.29</td>
<td>You ordered: 1 Soda 1 Burrito</td>
</tr>
<tr>
<td>Total Bill: $10.51</td>
<td></td>
<td>You ordered: Value Meal #1 1 Tostada 1 Enchilada</td>
<td>Total Bill: $11.98</td>
<td></td>
</tr>
<tr>
<td>You ordered: Value Meal #2 2 Sodas</td>
<td>$9.99</td>
<td></td>
<td>$2.75</td>
<td>You ordered: Value Meal #1 1 Enchilada</td>
</tr>
<tr>
<td>Total Bill: $8.63</td>
<td></td>
<td>You ordered: Family Value Meal</td>
<td>Total Bill: $14.75</td>
<td></td>
</tr>
<tr>
<td>You ordered: Value Meal #1 Ice Cream</td>
<td>$11.42</td>
<td></td>
<td>$9.57</td>
<td>You ordered: Value Meal #1 1 Enchilada 1 Soda</td>
</tr>
</tbody>
</table>
Sample Quiz

Name ______________________________________________________

1. Draw a picture to show the fewest number of bills and coins you would need to pay for a restaurant bill of $19.87.

2. Complete the chart below to show the equivalent fractions and decimals for each amount.

<table>
<thead>
<tr>
<th>Money in Decimals</th>
<th>Money in Fractions</th>
</tr>
</thead>
<tbody>
<tr>
<td>$2.50</td>
<td></td>
</tr>
<tr>
<td>$3.75</td>
<td>$\frac{5}{2}$</td>
</tr>
<tr>
<td>$7.40</td>
<td>$3 \frac{1}{2}$</td>
</tr>
</tbody>
</table>

3. Complete the chart below to show what the price would be for each discount/price increase.

<table>
<thead>
<tr>
<th>Price</th>
<th>20% off</th>
<th>50% off</th>
<th>125% of price</th>
</tr>
</thead>
<tbody>
<tr>
<td>$20.00</td>
<td>$16.00</td>
<td>$10.00</td>
<td></td>
</tr>
<tr>
<td>$35.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$50.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$64.00</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4. Using the value sheet from The Snack Bar (vowels = 25¢, consonants b-n = 5¢, consonants p-z = 10¢), what would be the price for each item listed below? (Bonus: draw a picture for each amount showing the fewest coins possible.)

   Apple pie = 
   Ice Cream = 
   Tostada = 
The unit included in this *Dining Out!* booklet takes into account all of the process standards outlined in NCTM’s *Principles and Standards for School Mathematics* (NCTM, 2000), including communication, connections, problem solving, reasoning and proof, and representation. References to those types of processes should be made throughout the activities. As for the content standards, the primary concentration is on the fraction, decimal, and percent objectives found in the *Number and Operations* standard. The performance objectives for each of these areas include the following:

**Instructional programs from pre-kindergarten through grade 12 should enable all students to —**

- understand numbers, ways of representing numbers, relationships among numbers, and number systems; understand meanings of operations and how they relate to one another;
- compute fluently and make reasonable estimates.

**Grades 3–5**

- recognize and generate equivalent forms of commonly used fractions, decimals, and percents;
- develop and use strategies to estimate computations involving fractions and decimals in situations relevant to students’ experience;
- select appropriate methods and tools for computing with whole numbers from among mental computation, estimation, calculators, and paper and pencil according to the context and nature of the computation and use the selected method or tools.

**Grades 6–8**

- work flexibly with fractions, decimals, and percents to solve problems;
- develop meaning for percents greater than 100 and less than 1;
- understand the meaning and effects of arithmetic operations with fractions, decimals, and integers;
- select appropriate methods and tools for computing with fractions and decimals from among mental computation, estimation, calculators or computers, and paper and pencil, depending on the situation, and apply the selected methods;
- develop and use strategies to estimate the results of rational-number computations and judge the reasonableness of the results.

*You will want to check with your own state framework to select performance objectives which are specific to your students.*
Dining Out!
Math Academy Checklist

- Determine the date, time, and schedule for your Math Academy
- Identify the objectives to be reinforced through this Math Academy
- Plan the opening assembly, if applicable
- Confirm the schedule and content with guest speaker, if applicable
- Customize the activities enclosed in this booklet
- Make copies of the activities, quiz and surveys
- Purchase and/or gather materials
  Note: Most hands-on materials for these activities can be created by copying the blackline masters throughout the booklet. In addition, you will need the following items:
  - plastic coins and plastic bills (or use “cut outs” of paper coins and bills on page 7)
  - student journals (with activity forms included)
  - money trays
  - optional – trail mix items for activity 2
  - dice
  - game pieces
- Make math journals for all students
- Distribute materials to other participating teachers, if applicable