Discovering Math: Computation
Teacher's Guide

Grade Level: 6–8	**Curriculum Focus:** Mathematics	**Lesson Duration:** Four class periods

Program Description

***Discovering Math: Computation* —** From operations with whole numbers, fractions, decimals, and integers to rational numbers and root extraction to order of operations, introduce students to more-advanced procedures for computation.

Lesson Plan

Student Objectives

- Add, subtract, multiply, and divide rational numbers.
- Create a game incorporating computation on rational numbers.
- Find the square and the cube of numbers.
- Use algebraic properties and apply a variety of computational methods and algorithms to evaluate expressions.
- Utilize the order of operations to correctly evaluate expressions.
- Work with a team to write and evaluate expressions.
- Calculate the rate of change caused by earned interest on investments.
- Use estimation to plan and budget for a trip to chosen location.

Materials

- *Discovering Math: Computation* video
- Creating a Game Directions (see below)
- Gameboard (see below)
- Number cubes
- Set of playing cards (numbers only, one per group of students)
- Calculators
- Number Cards (five *2* cards and five *3* cards), one set for each pair of students (see below)

- Order of Operations Poster (see below)
- Evaluating Expressions Practice Sheet (see below)
- Red, yellow, green, and blue chips
- Weekly circulars from local food stores
- Party Planning Directions (see below)
- Shopping List (see below)
- Rate of Change Activity Sheet (see below)

Procedures

1. Tell students they will be creating a game to practice operations on integers and rational numbers.
    - Review addition, subtraction, multiplication, and division of integers and rational numbers by displaying practice problems on the board. Have students complete the practice problems and share and explain their answers.
    - Divide the class into group of four students. Distribute copies of Creating a Game Directions and the gameboard to each group and discuss the directions.

      Students will create a game board by filling in operation symbols and numbers on the board. They should use at least three addition, three subtraction, three multiplication, and three division operations. They should also use positive numbers, negative numbers, decimals, and fractions (i.e., they may place *multiply by* $-\frac{1}{4}$ in one box on the game board).
    - When the gameboards are complete the students should play the game with their group.
        - Each student should draw cards to create their starting value.

          Direct them as to the number of cards to draw and the type of number they should create. Drawing one card will create a one-digit number. Drawing two cards can create a two-digit number or a fraction. If students are to work with positive and negative numbers, red cards can be positive values and black cards can negative values.
        - Students should roll number cubes to advance around the board. They must complete the computation on each space they land on, keeping track of their new value. For example, if a student started with 20 and landed on a space that directs them to add 5, they will then have a value of 25. Division calculations should be rounded to the nearest hundredth.
        - Students should complete their computations using mental math, paper and pencil, or calculators.
        - After each student has completed three trips around the board, the player with the highest value wins.

- Groups can switch gameboards if time allows.

2. Display 4^2 and 6^3 on the board. Ask students to find the answers. Have them share and explain their work.
3. Assign each student a partner. Distribute a number cube, Number Cards, and a calculator to each pair. Have one student roll the number cube and then pick a card. They must now find the square or the cube of the number they rolled (square if they picked a 2 number cared or cube if they picked 3 number card). The other student should check the work on the calculator. Have them take turn rolling the number cube and practicing squares and cubes
4. Display the phrase "Order of Operations." Ask students to describe the order of operations. They should recall the mnemonic, *Please Excuse My Dear Aunt Sally*, from the video. Review the order of operations (parentheses, exponents, multiplication, division, addition, and subtraction).
   - Distribute copies of the Order of Operations Poster.
   - Display the following expression:

     $3\ [(11 - 1) + 8] \times 5^2$

     Model how to evaluate the expression using the order of operations. Solve each step of the problem, using the appropriate color from the poster to show the step.

     $3\ [(11 - 1) + 8] \times 5^2$

     $3\ [10 + 8] \times 5^2$

     $3 \times 18 \times 5^2$

     $3 \times 18 \times 25$

     54×25

     $1{,}350$

   - Ask students to identify any patterns they notice when using the color-coded order of operations system.
   - When students are comfortable evaluating expressions, distribute the Evaluating Expressions Practice Sheet and have them complete it using the color-coded order of operations system.
5. Assign each student a partner. Give each pair a bag containing red, yellow, blue, and green chips. Review the operations that each color represents from the Order of Operations Poster.

   Students will use the chips to write their own expressions.

   - Have each student pull two chips from the bag.
   - Ask them to write expressions that include the elements that their chips represent. For example, if they pull one yellow, one green, and two blue chips, they will write an expression that includes one addition or subtraction element, one exponential element, and two multiplication or division elements.

- Then have students evaluate their partner's expression. They can check their work using a calculator.
- Ask students to recall the algebraic properties they learned about in the video. Have them share and explain their ideas.
    - Identity property of addition — the sum of a number and zero is the number
    - Identity property of multiplication —the product of any number and one is the number
    - Commutative property of addition — in a sum, you can add terms in any order
    - Commutative property of multiplication — in a product, you can multiply factors in any order
    - Associative property of addition — changing the grouping of terms in a sum does not change the sum
    - Associative property of multiplication — changing the grouping of terms in a factor in a product does not change the product
    - Distributive property of multiplication over addition — multiplication may be distributed across addition
- Ask students to identify situations in which they used an algebraic property when evaluating their expressions. Have each pair write two expressions that use an algebraic property. Ask them to share and explain their examples to the class or in writing.

6. Assign each student a partner. Tell students they will be planning a party, making a menu, and determining how much money they will spend on food for the party.

   They will be using arithmetic to complete the party planning. Review the operations and their uses with students. Have students give examples of when they would use addition, subtraction, multiplication, and division. They may use examples from the video.

   - Distribute copies of weekly circulars from local food stores and the Shopping List.
   - Distribute copies of the Party Planning Directions and discuss with students.
   - Allow students time to plan their menus and complete the Shopping list
   - Ask students to share their menus and Shopping Lists with the class. Have them explain the algorithms, operations, and strategies they used to find the costs of individual items, multiples items, and the total cost of the party.
   - Discuss the benefits of using estimation and the importance of comparing estimates with actual figures.

7. Review rate of change. Discuss how depositing money in an interest-earning bank account allows the value of the money to increase. Model an example by calculating how much interest $200 would earn at 3 percent in one year ($6). Next ask students how much the initial investment would be worth in two years ($206 + 3% = $212.18). Continue practicing rate of change until students are comfortable with concept.

- Distribute the Rate of Change Activity to students. Have them complete the calculations in the chart. Allow time for students to discuss the impact of earning interest on an initial investment (assume that no other deposits are made to avoid compounding and monthly interest).

Assessment

Use the following three-point rubric to evaluate students' work during this lesson.

- **3 points:** Students clearly demonstrated the ability to add, subtract, multiply, and divide rational numbers; clearly demonstrated the ability to find the square and cube of given numbers; clearly demonstrated the ability to use algebraic properties, order of operations, and a variety of computational methods and algorithms to evaluate expressions; clearly demonstrated the ability to calculate the rate of change caused by an interest-earning bank account; and clearly identified the ability to use estimation in addition, subtraction, multiplication, and division.
- **2 points:** Students satisfactorily demonstrated the ability to add, subtract, multiply, and divide rational numbers 80% of the time; satisfactorily demonstrated the ability to find the square and cube of given numbers 80% of the time; satisfactorily demonstrated the ability to use algebraic properties, order of operations, and a variety of computational methods and algorithms to evaluate expressions 80%of the time; satisfactorily demonstrated the ability to calculate the rate of change caused by an interest-earning bank account 80%of the time; and satisfactorily identified the ability to use estimation in addition, subtraction, multiplication, and division 80%of the time.
- **1 point:** Students demonstrated the ability to add, subtract, multiply, and divide rational numbers less than 80%of the time; demonstrated the ability to find the square and cube of given numbers less than 80%of the time; demonstrated the ability to use algebraic properties, order of operations, and a variety of computational methods and algorithms to evaluate expressions less than 80%of the time; demonstrated the ability to calculate the rate of change caused by an interest-earning bank account less than 80%of the time; and identified the ability to use estimation in addition, subtraction, multiplication, and division less than 80%of the time.

Vocabulary

associative property of addition

Definition: changing the grouping of terms in a sum does not change the sum

Context: (9 + 4) + 3 = 9 + (4 + 3)

associative property of multiplication

Definition: changing the grouping of factors in a product does not change the product

Context: (7 x 3) x 2 = 7 x (3 x 2)

commutative property of addition

Definition: in a sum, you can add terms in any order
Context: 6 + 3 = 3 + 6

commutative property of addition
Definition: in a product, you can multiply factors in any order
Context: 3 x 9 = 9 x 3

distributive property of multiplication over addition
Definition: multiplication may be distributed across addition
Context: 5 x (35 + 45) = (5 x 35) + (5 x 45)

identity property of addition
Definition: the sum of any number and zero is the number
Context: 9 + 0 = 9

identity property of multiplication
Definition: the product of any number and one is the number
Context: 7 x 1 = 7

order of operations
Definition: a set of rules for evaluating an expression with more than one operation
Context: The teacher told the students to observe the order of operations when solving expressions.

Academic Standards

Mid-continent Research for Education and Learning (McREL)
McREL's Content Knowledge: A Compendium of Standards and Benchmarks for K–12 Education addresses 14 content areas. To view the standards and benchmarks, visit http://www.mcrel.org/compendium/browse.asp.

This lesson plan addresses the following benchmarks:

- Adds, subtracts, multiplies, and divides integers, and rational numbers.
- Adds and subtracts fractions with unlike denominators; multiples and divides fractions.
- Understands exponentiation of rational numbers and root-extraction (e.g., squares and square roots, cubes and cube roots).
- Selects and uses appropriate computational methods (e.g., mental, paper and pencil, calculator, computer) for a given situation.
- Understands the correct order of operations for performing arithmetic computations.
- Uses proportional reasoning to solve mathematical and real-world problems (e.g., involving equivalent fractions, equal ratios, constant rate of change, proportions, and percents).

- Understands the properties of operations with rational numbers (e.g., distributive property, commutative and associative properties of addition and multiplication, inverse properties, identity properties).
- Knows when an estimate is more appropriate than an exact answer for a variety of problem situations.
- Understands how different algorithms work for arithmetic computations and operations.

National Council of Teachers of Mathematics (NCTM)
The National Council of Teachers of Mathematics (NCTM) has developed national standards to provide guidelines for teaching mathematics. To view the standards online, go to http://standards.nctm.org.

This lesson plan addresses the following standards:

- Work flexibly with fractions, decimals, and percents to solve problems.
- Understand and use ratios and proportions to represent quantitative relationships.
- Develop meaning for integers and represent and compare quantities with them.
- Understand the meaning and effects of arithmetic operations with fractions, decimals, and integers.
- Use the associative and commutative properties of addition and multiplication and the distributive property of multiplication over addition to simplify computations with integers, fractions, and decimals.
- Understand and use the inverse relationships of addition and subtraction, multiplication and division, and squaring and finding square roots to simplify computations and solve problems.
- 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 analyze algorithms for computing with fractions, decimals, and integers and develop fluency in their use.
- Develop and use strategies to estimate the results of rational-number computations and judge the reasonableness of the results.
- Develop, analyze, and explain methods for solving problems involving proportions, such as scaling and finding equivalent ratios.
- Solve problems that arise in mathematics and in other contexts.
- Apply and adapt a variety of appropriate strategies to solve problems.

Support Materials

Develop custom worksheets, educational puzzles, online quizzes, and more with the free teaching tools offered on the Discoveryschool.com Web site. Create and print support materials, or save them to a Custom Classroom account for future use. To learn more, visit

- http://school.discovery.com/teachingtools/teachingtools.html

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DVD Content

This program is available in an interactive DVD format. The following information and activities are specific to the DVD version.

How to Use the DVD

The DVD starting screen has the following options:

***Play Video*—**This plays the video from start to finish. There are no programmed stops, except by using a remote control. With a computer, depending on the particular software player, a pause button is included with the other video controls.

***Video Index*—**Here the video is divided into chapters indicated by title. Each chapter is then divided into four sections indicated by video thumbnail icons; brief descriptions are noted for each section. To play a particular segment, press Enter on the remote for TV playback; on a computer, click once to highlight a thumbnail and read the accompanying text description and click again to start the video.

***Quiz*—**Each chapter has four interactive quiz questions correlated to each of the chapter's four sections.

***Standards Link*—**Selecting this option displays a single screen that lists the national academic standards the video addresses.

***Teacher Resources*—**This screen gives the technical support number and Web site address.

Video Index

I. Operations on Integers and Rational Numbers (10 min.)

Operations on Integers and Rational Numbers: Introduction
Explore addition, subtraction, and multiplication of rational numbers.

Example 1: Adding and Subtracting Rational Numbers
Learn how to add and subtract rational numbers with decimals. It's important to line up the decimals.

Example 2: Multiplying Rational Numbers
See how to multiply and divide rational numbers using long multiplication and division. The placement of the decimal in the answer is important.

Example 3: Dividing Rational Numbers
Discover how the earned run average in baseball is an example of rational number division.

II. Operations on Fractions (10 min.)

Operations on Fractions: Introduction
Explore addition and multiplication of mixed numbers, conversion of mixed numbers to improper fractions, and identification of the least common denominator.

Example 1: Adding and Subtracting Fractions
Use equivalent fractions and the least common denominator to add and subtract mixed numbers and learn how to convert improper fractions to mixed numbers.

Example 2: Multiplying Fractions
See how to multiply mixed numbers by converting to fractions and then converting improper fractions back to mixed numbers.

Example 3: Dividing Fractions
Learn how to divide mixed numbers by converting them to fractions and then converting improper fractions back to mixed numbers.

III. Exponents and Roots (10 min.)

Exponents and Roots: Introduction
Find the square and cube of a number. Then use squares and cubes to find the area and volume of a cube.

Example 1: Squares
Multiply a number by itself to find its square. See why when a negative number is squared the answer is positive and when a fraction less than one is squared the answer is smaller than the original fraction.

Example 2: Cubes
Find the cube of positive and negative numbers. See why when a negative number is cubed the answer is negative and when a fraction less than one is cubed the result is a smaller number.

Example 3: Square Roots and Cube Roots
Learn how to find the square and cube roots of positive and negative numbers.

IV. Computational Methods (10 min.)

Computational Methods: Introduction
Investigate several computational methods — mental math, pencil and paper, estimation, calculator, and computer. See why different situations and purposes for calculating require different methods of computation.

Example 1: Mental Math and Estimation
Explore problems that do not require exact answers and can be calculated using mental math or estimation.

Example 2: Paper and Pencil
See how noncomplex calculations that require exact answers can be completed using paper and pencil.

Example 3: Calculator and Computer
Use a calculator or computer for complex problems that require accurate solutions and cannot be computed using mental math, estimation, or paper and pencil.

V. Order of Operations (11 min.)

Order of Operations: Introduction
Explore the order of operations using conversions from Fahrenheit to Celsius.

Example 1: Simple Orders
Investigate the four main mathematical operations — addition, subtraction, multiplication, and division.

Example 2: More Orders
Use the order of operations to calculate the total revenue a roller coaster generates in one day.

Example 3: Exponents
See how the order of operations is used to solve an equation involving parenthesis, exponents, multiplication, division, addition, and subtraction.

VI. Proportional Reasoning (10 min.)

Proportional Reasoning: Introduction
Explore ratios and proportions — a ratio expresses the relationship of one number to another and a proportion is a statement that two ratios are equal.

Example 1: Scale Models
See how scale models are used when planning new structures and explore the ratios and proportion of the human body.

Example 2: Rate of Change
Use ratios and proportions to calculate the amount of interest earned on the principle in a bank account.

Example 3: Sampling
See how a random sample of subway riders and ratios and proportions can be used to predict the make-up of future groups of subway riders.

VII. Identity, Inverse, and Commutative Properties (11 min.)

Identity, Inverse, and Communicative Properties: Introduction
Explore identity, inverse, and commutative, properties in math that guide calculations and problem solving.

Example 1: Identity Elements
Investigate the identity property of addition and multiplication. The identity element in addition in zero and the identity element in multiplication is one.

Example 2: Inverse Operations and Elements
See how inverse operations reverse another operation, like addition and subtraction. The inverse element in addition is zero. The multiplicative inverse of a number is its reciprocal.

Example 3: Commutative Properties
Learn why the commutative property of addition and multiplication allows for numbers to be added or multiplied in any order.

VIII. Associative and Distributive Properties (10 min.)

Associative and Distributive Properties: Introduction
Learn why the associative property of addition and multiplication allows for numbers to be grouped in any order and the distributive property allows multiplication to be distributed across addition.

Example 1: Associative Property of Addition
Explore the associative property of addition and take a closer look at why it allows for numbers to be grouped in any way when adding.

Example 2: Associative Property of Multiplication
Take a closer look at the associative property of multiplication and see how it allows for numbers to be grouped in any way when multiplying.

Example 3: Distributive Property
Examine the distributive property of multiplication over addition and take a closer look at how it allows for multiplication to be distributed across numbers being added.

IX. Appropriate Estimates (7 min.)

Appropriate Estimates: Introduction
Compare estimates and accurate measurements and explore different situations requiring estimates or accurate measurements.

Example 1: Exact Number Needed
Take a closer look at some situations requiring exact measurements, such as measuring steel beams for a building.

Example 2: Adequate Estimate
Explore how estimation provides an approximate measurement.

Example 3: Flexibility
Take a closer look at approximate measurements by planning a travel budget.

X. Algorithms for Arithmetic Operations and Computations (8 min.)

Algorithms for Arithmetic Operations and Computations: Introduction
Investigate algorithms, a set of steps used to solve a problem.

Example 1: Addition and Subtraction
Take a closer look at step-by-step addition and subtraction algorithms by determining the cost of a trip.

Example 2: Multiplication
See a step-by-step multiplication algorithm when determining how much money a worker earns in one week.

Example 3: Division
Determine how many cans of vegetables a large family will use in one month using a step-by-step division algorithm.

Quiz

I. Operations on Integers and Rational Numbers

1. 3.2 x .4 = ____
   A. 0.128
   B. 1.28
   C. 12.8
   D. 128

   Answer: B

2. You spend $2.56 on apples and $3.67 on bananas and pay with a $10 bill. How much change will you receive?
   A. $3.77
   B. $3.87
   C. $4.23
   D. $6.23

   Answer: A

3. Oliver would like to buy 3.25 pounds of shrimp that cost $5.99 a pound. How much money does he need?
   A. $19.24
   B. $19.47
   C. $19.50
   D. $20.46

   Answer: B

4. John gave up 4 runs and pitched for $5\frac{1}{2}$ innings. What is his ERA?

   A. 1.24
   B. 1.98
   C. 6.55
   D. 7.20

   ERA = (r ÷ i) x 9
   r = earned runs given up
   i = innings pitched

   Answer: C

II. Operations on Fractions

1. John purchased $4\frac{1}{4}$ pounds of pears and $3\frac{2}{3}$ pounds of apples. How many pounds did he buy in all?

   A. $7\frac{3}{7}$
   B. $7\frac{5}{12}$
   C. $7\frac{5}{6}$
   D. $7\frac{11}{12}$

   Answer: D

2. $8\frac{5}{7} - 3\frac{1}{2} =$ ____

   A. $5\frac{3}{14}$
   B. $5\frac{4}{14}$
   C. $5\frac{3}{7}$
   D. $5\frac{4}{5}$

   Answer: A

3. Ken earns $1\frac{1}{4}$ vacation days for every month he works. How many vacation days will he have after working 14 months?

   A. 14
   B. 15
   C. 16.5
   D. 17.5

   Answer: D

4. The baker needs $1\frac{1}{8}$ pounds of dough to make one piecrust. If she has$15\frac{3}{4}$ pounds of dough how many crusts can she make?
   A. 14
   B. 16
   C. 20
   D. 22

   Answer: A

III. Exponents and Roots

1. $7^3 =$ ____
   A. 21
   B. 147
   C. 343
   D. 2,401

   Answer: C

2. $-\frac{1}{4}^2$

   A. $-\frac{1}{161}$ C. $\frac{1}{16}$

   B. $-\frac{1}{8}$ D. $\frac{1}{8}$

   Answer: C

3. What is the volume of a cube whose sides are each 52 inches long?
   A. 156 cubic inches
   B. 2,756 cubic inches
   C. 18,928 cubic inches
   D. 140,608 cubic inches

   Answer: D

4. Justin has a cube shaped aquarium and the volume is 512 cubic inches. What is the length of each side?
   A. 170.2 inches
   B. 18 inches
   C. 12 inches
   D. 8 inches

   Answer: D

IV. Computational Methods

1. The cave diver is trying to reach a depth of 450 feet below the water surface and has already descended 97 feet. About how many more feet does he need to descend to reach the goal?
   A. 200 feet
   B. 250 feet
   C. 300 feet
   D. 350 feet

   Answer: D

2. Austin has 20 baseball cards in his collection and gets 35 more for his birthday. Then he gives 5 of his cards to his brother. How many cards does he have now?
   A. 60
   B. 55
   C. 50
   D. 45

   Answer: C

3. What method of computation is most effective for making accurate calculations when there are many numbers and their relationships are complex?
   A. computer
   B. estimation
   C. mental math
   D. paper and pencil

   Answer: A

V. Order of Operations

1. 95 degrees Fahrenheit = ____ degrees Celsius
   A. 21
   B. 35
   C. 49
   D. 52

   $$\text{Celsius} = \frac{5}{9} \times (F - 32)$$

   Answer: B

2. The Crazy Coaster has 3 trains, each train holds 27 people, and runs 9 times in 1 hour. If the Crazy Coaster operates for 13 hours a day, how many people can ride it each day?
   A. 28,431
   B. 19,477
   C. 11,664
   D. 9,477

   Answer: D

3. Solve.
   $(((18 \div 2 \times 35) + (21 \div 7 \times 16)) \times 7) - (0.25 \times 80)$
   A. 2,521
   B. 2,461
   C. 2,233
   D. 631

   Answer: A

4. Solve.
   $(14 - 2) \times 5^2 + (16 \div 4)$
   A. 192
   B. 240
   C. 304
   D. 348

   Answer: C

VI. Proportional Reasoning

1. Assume the ratio of hand to foot length is 7:9. If an artist draws a person with hands 35 inches long, how long should the feet be to maintain the correct proportions?
   A. 35 inches
   B. 36 inches
   C. 42 inches
   D. 45 inches

   Answer: D

2. Lei has $200 in her bank account and the account earns 3% interest per year. If she leaves the $200 in her account, how much money will Lei have after one year?
   A. $6
   B. $206
   C. $260
   D. $306

   Answer: B

3. Ian is studying the ant and beetle population in his backyard. In a random sample Ian finds the ratio of ants to beetles as 3:7. If he finds 42 ants in another section of his backyard how many beetles can he expect to find?
   A. 2
   B. 14
   C. 98
   D. 112

   Answer: C

VII. Identity, Inverse, and Communicative Properties

1. Identify the identity element in addition?
   A. 0
   B. 1
   C. 2
   D. 10

   Answer: A

2. Identify the multiplicative inverse of 9.
   A. –9
   B. $\frac{1}{9}$
   C. 0
   D. 1

   Answer: B

3. Which number sentence demonstrates the commutative property of multiplication?
   A. 3 + 4 + 9 = 4 + 9 + 3
   B. 45 – 23 = 23 = 45
   C. 3 x 5 x 9 = 5 x 3 x 9
   D. 45 x 1 = 45

   Answer: C

VIII. Associative and Distributive Properties

1. Identify the property that allows for the numbers in an addition problem to be grouped in any way.
   A. grouping property of addition
   B. associative property of addition
   C. distributive property of addition
   D. commutative property of addition

   Answer: B

2. Use the associative property of multiplication to solve.
   12 x 30 x 5 = ____
   A. 60
   B. 150
   C. 360
   D. 1,800

   Answer: D

3. Use the distributive property to solve.
   9(425 + 257) = ____
   A. 6,138
   B. 3,825
   C. 2,313
   D. 1,512

   Answer: A

IX. Appropriate Estimates

1. Sue invited 47 people to her birthday party. If she estimates that everyone will come and bring one guest, about how many people will be at the party?
   A. 50
   B. 60
   C. 75
   D. 100

   Answer: D

2. Heather and Joe invite 75 people to their party. If they estimate that each person will eat four cookies that are $1.25 each, about how much money should they budget for cookies?
   A. $93.75
   B. $193.75
   C. $300
   D. $375

   Answer: D

3. Barb is traveling to California for 10 days and estimates she will spend about $75 a day. About how much money will she spend on her trip?
   A. $650
   B. $700
   C. $750
   D. $1,000

   Answer: C

X. Algorithms for Arithmetic Operations and Computations

1. Walter is traveling in Europe with $250 dollars that he needs to convert to euros. If the exchange rate is .83 euros = $1.00, how many euros will he get?
   A. 2.07 euros
   B. 20.75 euros
   C. 207.50 euros
   D. 2075 euros

   Answer: C

2. Nancy's is buying 4 movie tickets that cost $8.25 each. If she has one coupon worth $2.25, how much will she spend on the tickets?
   A. $33.00
   B. $30.75
   C. $24.00
   D. $9.00

   Answer: B

3. Alex works at the local deli and makes $9.50 an hour. If Alex works 38 hours in one week, how much money will he earn?
   A. $104.50
   B. $251.00
   C. $357.00
   D. $361.00

   Answer: D

4. Yvonne and her mom baked 52 cookies. Yvonne wants to give each of her 8 friends an equal number of cookies. How many cookies will each friend get?
   A. 6
   B. 6.5
   C. 7.5
   D. D.8

   Answer: B

Creating a Game Directions

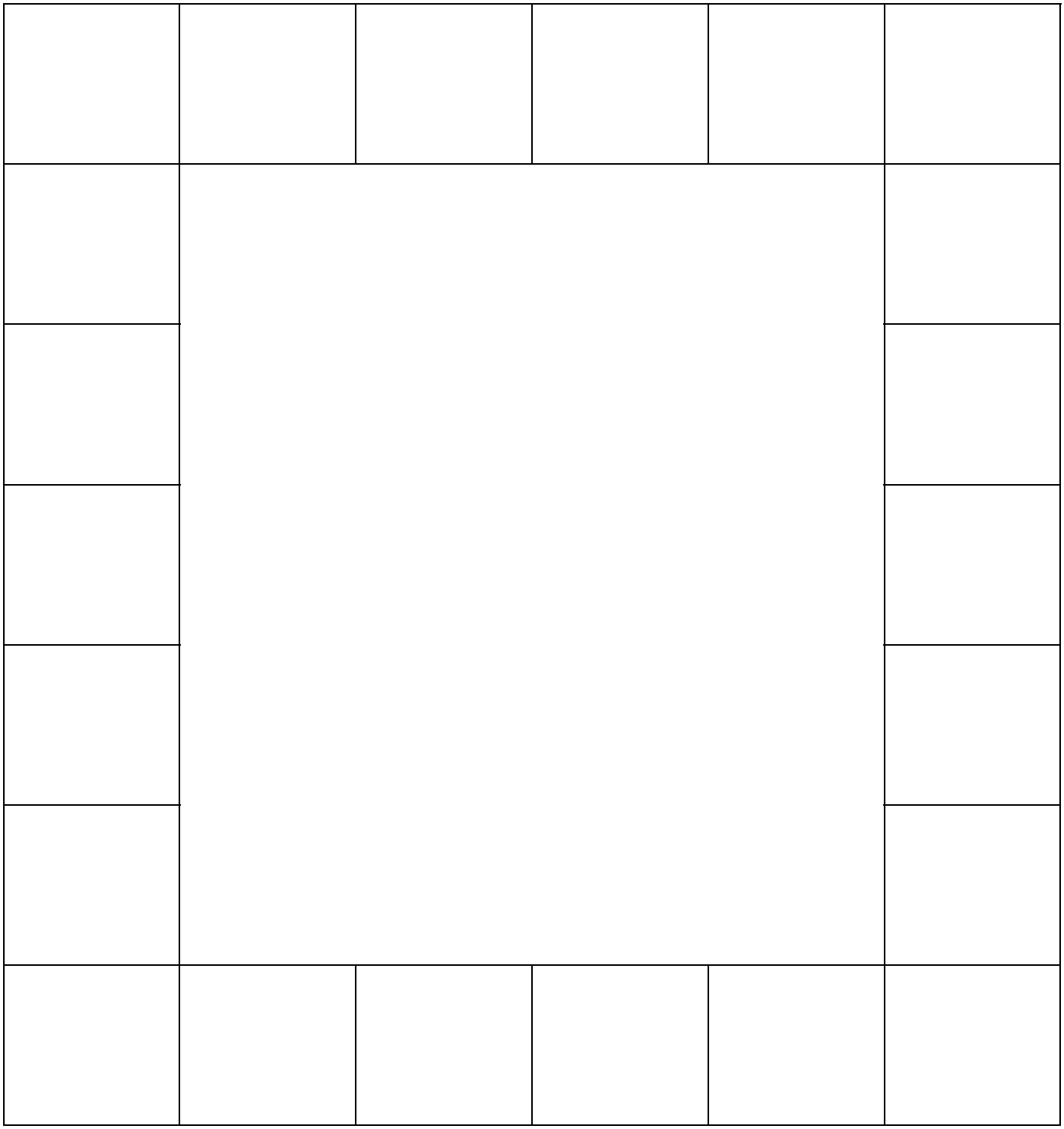
Creating a Game

1. Create a game to practice operations on integers and rational numbers.
2. Fill in the spaces on the gameboard with one operation symbol and an integer or rational number.
3. Include at least three addition operations, three subtraction operations, three multiplication operations, and three division operations on the game board.
4. Use your own ideas for the remaining spaces on the board.
5. Include a starting point in one of the spaces on the board.

Playing the Game

1. All players create a beginning value by choosing cards from the deck. Your teacher will decide the number of cards and type of number to be created.
2. All players place their playing pieces on the start space.
3. Player one rolls the number cube and advances that number of spaces on the board.
4. Player one writes and evaluates an expression by taking their beginning value and performing the operation shown on the space.
5. Player one records their new value and play passes to the left.
6. Player two repeats steps 3–5.
7. Play continues until all players have completed three trips around the board.
8. The player with the highest value at the end of the game is the winner.

Gameboard



Number Cards

2	3
2	3
2	3
2	3
2	3

Order of Operations Poster

Please Excuse My Dear Aunt Sally

Parentheses

Exponents

Multiplication

Division

Addition

Subtraction

Evaluating Expressions Practice Sheet

$7 + 16 \times 3 \div 6 =$	$(14 + 6) \times 8 =$
$9 \div [3 \times (\frac{5}{3} + \frac{4}{3})] =$	$8.4 \div (21 - 14) =$
$\frac{7}{4} + \frac{5}{4} + \frac{1}{4} =$	$120 \div [(6 + 2) \times 3] =$
$(46 + 18) \div (4 \times 2) =$	$\frac{1}{2} \times (64 \div 8) + 4^2 =$
$2^3 + (8 + 7) \times 9 =$	$4 + 3.9 \div 1.3 =$
$16 \div (7 - 3) \times 4^2 =$	$18 \div (8 + 4 - 9) =$

Party Planning Directions

- Create a menu for the party.
- Use the sales circular to determine the price of the items needed for the party.
- List each item and the cost.
- Determine how many of each item will be needed for the party.
- Estimate the total cost for each item.
- Find the actual total cost for each item.
- Find the difference between the estimated and actual cost for each item.
- Estimate the total cost for the party menu.
- Calculate the actual total cost for the party menu.
- Find the difference between the estimated and actual cost for the party menu.

Shopping List

Item	Cost	Quantity	Estimated Cost	Actual Cost	Difference Between Estimated and Actual Cost
		Total			

Rate of Change Activity

Initial Investment	Yearly Interest Rate	Value After One Year	Value After Two Years
$100.00	3%		
$200.00	2%		
$250.00	4%		
$500.00	3%		
$1,000.00	5%		
$1,500.00	4%		
$10,000.00	4%		

Extension:

Can you calculate the value of each investment after 5 years and 10 years?