Name _____   Date _____

Introducing This Year's Mathematics

NCTM Standards 1, 2, 6, 7, 8, 9

1 Make an organized list of all possible combinations of dimes, nickels, and pennies that make 25¢. Use this table for your list.

Dimes	Nickels	Pennies

2 What is the total number of different combinations?

_____

Explain how you know you have listed all the possible combinations.

_____

_____

3 Make an organized list of the number of coins in each coin combination in Problem 1. Use this table for your list.

Dimes	2										
Nickels	1										
Pennies	0										
Number of Coins	3										

4 Do any of the combinations have the same number of coins?

_____

5 **Challenge** Use the table above to help you answer the following questions.

How many different combinations of dimes, nickels, and pennies are worth 24¢?

_____

Explain how you know.

_____

_____

_____

_____

How many different combinations of dimes, nickels, and pennies are worth 26¢?

_____

Explain how you know.

_____

_____

_____

Name _____   Date _____

Investigating Cross Number Puzzles

NCTM Standards 1, 2, 7, 8

As you complete these puzzles, look for shortcuts. Remember that amounts on both sides of a thick line must be the same.

1

51	13	
20	16	

2

60	4	
30	6	

3

	2	42
	9	
		81

4

39		42
	29	
49		

5

18	19	20	
19		18	
20	18	19	
			171

6

30	20	7	
20		30	57
7	30	20	

prime   △   III   three   **3**

7

	51	351
	58	
400		

8

	350	395
32		
	460	

9 Put numbers in the shaded boxes to make up your own Cross Number Puzzle. Complete the puzzle.

10 Explain how you know what numbers to write to the right and below the thick lines.

_____

_____

_____

_____

11 For lunch, Kim bought a sandwich for $2.50 and a glass of lemonade for $1.25. Steve bought a salad for $1.25 and a slice of pizza. If they both spent the same amount, how much was the slice of pizza? Explain how you know.

_____

_____

12 Challenge Complete the puzzles.

50		100	200
	65	35	
45		55	
125	135		

	15		600
		60	300
1,086	6	180	
2,205	45	360	

Chapter 1
Lesson 3
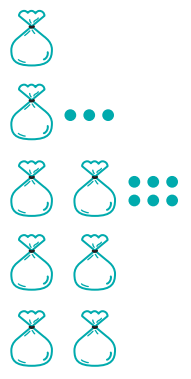
Investigating Input-Output Tables

NCTM Standards 1, 2, 6, 8

Complete the tables.
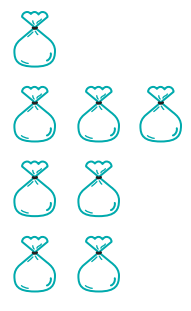
1

INPUT	2	5	1	3	0	4
Add 3	5					
Multiply by 2	10					
Subtract 6	4					
MACHINE OUTPUT	4					

2

INPUT	2	5	1	3	0	4
Multiply by 3	6					
Subtract the Input	4					
MACHINE OUTPUT	4					

Every week you earn a certain amount of money. You put half in the bank and spend half.

3 If you earned $6 each week, how much money would you have spent by the end of 4 weeks? Show your work.

_____

4 If you earned $8 a week instead, how much money would you have been able to spend after 4 weeks? Show your work.

_____

5 If you have spent $40 after working for 4 weeks, how much money did you earn each week? Explain.

_____

_____

Complete the tables.

6

INPUT	4	3	5	9		
Multiply by 10	40				70	
Divide by 5					14	20
MACHINE OUTPUT					14	20

7

INPUT	4	5	0	7			
Multiply by 6					60		
Divide by 3						24	
MACHINE OUTPUT							

8 Find a one-step rule that would give the same outputs for the same inputs as the two-step rule shown in Problem 7.

_____

_____

9 **Challenge** Complete the table.

INPUT	14	20	30				
Subtract 8				17			
Multiply by 2					60		
Add 16							
MACHINE OUTPUT							

Name _____   Date _____

Connecting Input-Output Machines and Puzzles

NCTM Standards 1, 2, 6, 9

First, complete the Cross Number Puzzle on the left. Then double each of the numbers to complete the puzzle on the right. Check to make sure the new puzzles work.

EXAMPLE

INPUT

2	1	3
4	6	10
6	7	13

MACHINE OUTPUT

4	2	6
8	12	20
12	14	26

This output puzzle works!

1

INPUT

6	8	
9	7	

MACHINE OUTPUT

12		

Does this output puzzle work?

_____

2

INPUT

10		
	9	19
	17	

MACHINE OUTPUT

Does this output puzzle work?

_____

3 Emma counted 14 goldfinches and 8 wrens at her birdfeeders on Saturday morning. In the afternoon she counted twice as many of each kind of bird. How many birds did Emma count in all on Saturday? Explain how you know.

_____

_____

Complete all puzzles by filling in the missing numbers. Remember that the machine doubles the numbers in the Input puzzles. Here you may have to look at the numbers in the Output puzzles to complete the Input puzzles.

4

INPUT

30		39
	5	
		74

MACHINE OUTPUT

	18	
60		70
		148

5

INPUT

140		
	120	
340		

MACHINE OUTPUT

	200	
400		640

6 Explain how you completed the top row of the input puzzle in Problem 5.

_____

_____

_____

7 Challenge

INPUT

		13	
22			53
			42
47			

MACHINE OUTPUT

22			
	20	42	
		24	
	82		

8 eight VIII 2 2 2

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Name _____ Date _____

Introducing Negative Outputs
NCTM Standards 1, 2, 8, 9, 10

Complete the tables.

1

INPUT	4	6	10	7	35	18
Add 20	24	26				
Subtract 8	16					
MACHINE OUTPUT	16					

2

INPUT	4	6	10	7	3	8
Add 3	7					
Multiply by 2	14					
Subtract the Input	10					
Add 6						
MACHINE OUTPUT						

3 The temperature in the evening was 7 less than the temperature in the afternoon. Use the table to record some possible afternoon and evening temperatures.

Afternoon							
Evening − 7							

4 Suppose the temperature was 0 F in the afternoon. What would the new temperature be in the evening after it dropped 7 ? Explain how you found the answer.

_____

_____

Use the number lines to complete the tables. Fill in the shorthand rules.

```
←——|——|——|——|——|——|——|——|——|——|——|——|——|——|——|——|——|——→
  ⁻8 ⁻7 ⁻6 ⁻5 ⁻4 ⁻3 ⁻2 ⁻1  0  1  2  3  4  5  6  7  8
```

5

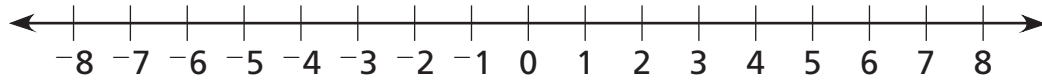| INPUT	6	8	4	1	2	0		🛍
OUTPUT	0	2	2				4	🛍 6

6

INPUT	4	7	1	3	2	0	4	🛍
OUTPUT	1	4	2					🛍 ___

```
←——|——|——|——|——|——|——|——|——|——|——|——|——|——→
 ⁻30 ⁻25 ⁻20 ⁻15 ⁻10 ⁻5  0  5  10  15  20  25  30
```

7

INPUT	15	10	8	20	0	10		🛍
OUTPUT	6	1	1				25	🛍 ___

8 For Problem 7, explain how you found the input when the output was 25.

_____

_____

_____

9 **Challenge** Complete the table and shorthand rule.

INPUT	72	14	8	24	31			🛍
OUTPUT	22	36	58			3	104	🛍 ___

Name _____   Date _____

Determining Rules Using Two Operations

NCTM Standards 1, 2, 6, 8, 9

Complete the tables and shorthand rules.

1

INPUT	7	1	4	12	0	21		x
OUTPUT	14	2	8				50	$2x$

2

INPUT	1	7	8	5	14	29		x
OUTPUT	13	19	20				12	x ____

3

INPUT	1	2	5	10	9	50	100	x
OUTPUT	3	5	11					$2x$ ____

4

INPUT	2	1	3	5	7	10		x
OUTPUT	4	1	7				22	____ 2

5 One week, Beth charged $5 for each of the 3 days she worked in her neighbor's garden and $8 for mowing the lawn once. How much did she earn? Explain.

_____

_____

6 Tim earned $7 for each of the 4 days he raked leaves in his neighbor's yard. He spent $10 to buy a new rake. How much did he have left? Explain.

_____

_____

Complete the tables and write shorthand rules.

7

INPUT	10	7	11	8	15	31	200	x
OUTPUT	19	13	21					

8

INPUT	3	1	5	7		9		x
OUTPUT	18	6	30		24		48	

9

INPUT	2	3	5	7	50	44	110	x
OUTPUT	9	12	18					

10

INPUT	2	1	10	4			100	x
OUTPUT	9	5	41		25	37		

11 Challenge Complete the table and then describe what a machine might be doing to generate these outputs. Use pictures, numbers, or words to explain the machine's rule.

INPUT	14	20	11	18		21	
OUTPUT	7	10	$5\frac{1}{2}$		5		$17\frac{1}{2}$

Name _____   Date _____

Multiplying Cross Number Puzzles

NCTM Standards 1, 2, 6, 7, 8

Complete all the puzzles.

1   **A**

4	7	11
8	3	11
12	10	22

× 3

A × 3

12		

2   **B**

9	12	
10	11	

× 4

B × 4

76		

3   **C**

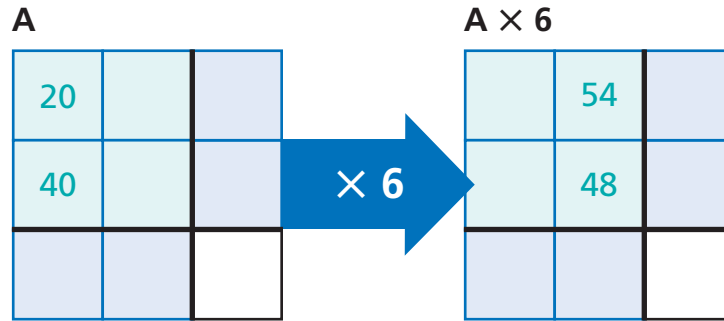| 1	7	9	
4	2	8	
6	5	3	

× 8

C × 8

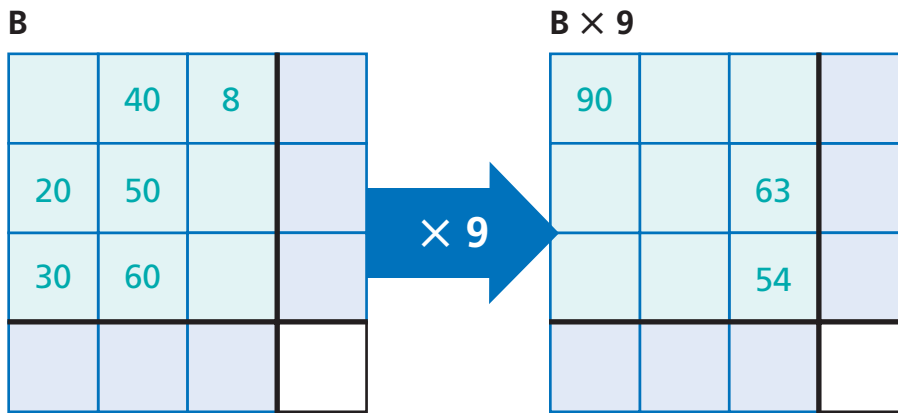|			

4 A small package of charms has 4 silver charms and 2 gold charms. A large package has 3 times as many gold and silver charms. How many charms are in a large package? Explain.

_____

_____

_____

_____

Complete all the puzzles. To complete the puzzles on the left, you may need to use some of the numbers in the puzzles on the right.
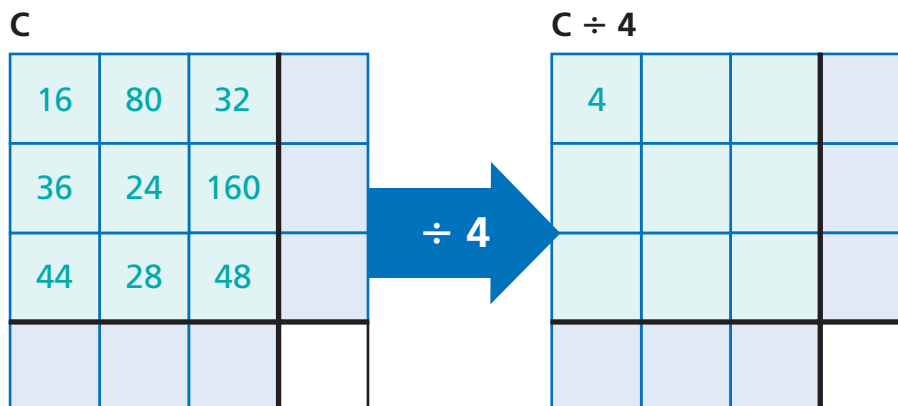
5

A

20		
40		

$\times\,6$

A $\times$ 6

	54	
	48	

6

B

	40	8	
20	50		
30	60		

$\times\,9$

B $\times$ 9

90			
		63	
		54	

7 For Problem 6, explain how you found the three missing numbers for the light green boxes in Puzzle B.

_____

_____

_____

8 Challenge Divide.

C

16	80	32	
36	24	160	
44	28	48	

$\div\,4$

C $\div$ 4

4			

Name _____ Date _____

Problem Solving Strategy
Look for a Pattern
NCTM Standards 1, 2, 6, 8, 9

Understand
Plan
Solve
Check
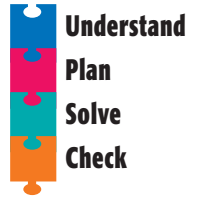
1 The Rockin' Rock Candy machine only takes nickels. There is no sign on the machine telling you how many candies you will get for each nickel.

The table shows the number of candies given for 1 nickel, 2 nickels, and 6 nickels. Complete the table to show the number of candies you will get for 25¢, 15¢, and 50¢. Write the rule.

Nickels	1	2	6				x
Candies	6	10	26				

2 Jon and Peter each saved a certain amount of money each week. Complete the tables. How many weeks did it take each boy to save $60?

JON

Weeks	3	6	8		x
Dollars Saved	18	36	48	60	

_____ weeks

PETER

Weeks	3	6	8		x
Dollars Saved	15	30	40	60	

_____ weeks

3 Use the toothpick patterns of triangles to complete the table and write the rule.
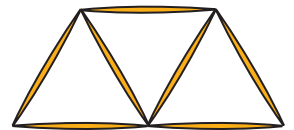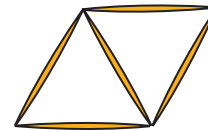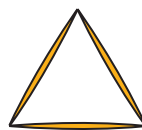
Number of Triangles	1	2	3	4	6	8	x
Number of Toothpicks	3	5					

Problem Solving Test Prep

Choose the correct answer.

1 Alice had a collection of 33 baseball cards. She gave 5 cards to her sister. Let *c* represent the number of cards Alice had left. Which number sentence could be used to find the number of cards Alice had in her collection?

    A. *c*   5   33

    B. *c*   5   33

    C. 5   *c*   33

    D. 5   *c*   33

2 A typical slice of cheese pizza contains 248 calories, 11 grams of protein, 24 grams of carbohydrates, and 12 grams of fat. How many calories are in an eight-slice pizza?

    A. 1,984 calories

    B. 1,900 calories

    C. 1,620 calories

    D. 1,500 calories

3 Jenny has 2 rooms to carpet. Each room has the same dimensions as the diagram below. What is the area of the 2 rooms combined?

6 ft

←7 ft

10 ft

3 ft

3 ft

9 ft
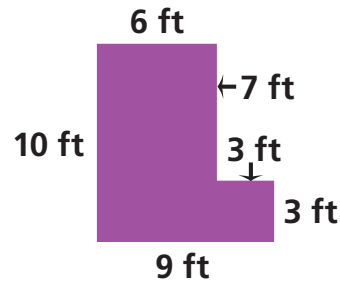
    A. 38 square feet

    B. 69 square feet

    C. 78 square feet

    D. 138 square feet

4 What rule can you use to find the next number in the number pattern?

1; 10; 100; 1,000; ■

    A. Add 9.   **C.** Multiply by 10.

    B. Add 90.   **D.** Multiply by 100.

✎ Show What You Know

Solve each problem. Explain your answer.

5 Bret built a brick wall. He began with 1,051 bricks and built the wall that was between 31 and 36 bricks long. There were 31 bricks left over. How many bricks high is the wall Bret built? Explain how you know.

_____

_____

_____

6 Draw what this figure will look like if it is rotated 180 around the point. Explain how you know.

_____

_____

_____

2 2 2 2

Chapter 1 **Review/Assessment**

Complete the Cross Number Puzzles. Lesson 2

1

43	18	
27	52	

2

35		80
	75	
62		

3 Complete the Cross Number Puzzle on the left. Then double each of the numbers to complete the puzzle on the right. Lesson 4

INPUT

28		
	40	67

× 2

OUTPUT

56		
		134

4 Complete both Cross Number Puzzles. Lesson 7

INPUT

5	15	
11	6	

× 4

OUTPUT

5 Complete the table. **Lesson 3**

INPUT	1	2	4	6		
Multiply by 8					64	
Divide by 4					16	20
MACHINE OUTPUT					16	20

Complete the tables and rules. **Lessons 5 and 6**

−10 −9 −8 −7 −6 −5 −4 −3 −2 −1 0 1 2 3 4 5 6 7 8 9 10
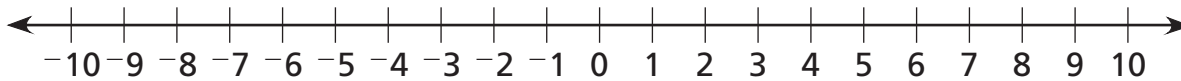
6

INPUT	6	2	1	0	4		5		8	3	7	x
OUTPUT	3	1	2		9		5					x ___

7

INPUT	4	2	1	7	11		12	9			6	x
OUTPUT	9	5	3			17			11	21		___x 1

8

INPUT	4	5	6	0	2	11					7	x
OUTPUT	16	19	22				40	31	28	34		$3x$ ___

9 Use the tile patterns to complete the table and write the rule. **Lesson 8**
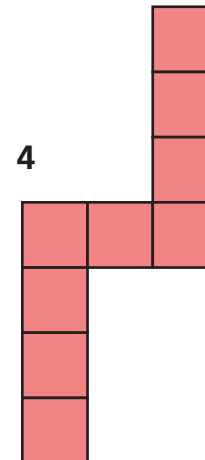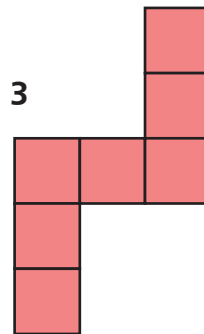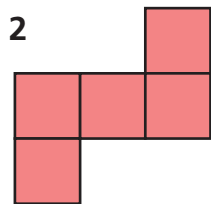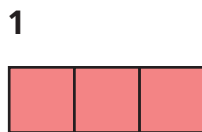
1   2   3   4

Pattern Number	1	2	3	4	5	6	x
Number of Tiles	3						