Name _____ Date/Time _____

Introducing Magic Squares

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

Find all the sums and answer the questions.

1

2	9	4	→ ____
7	5	3	→ ____
6	1	8	→ ____

15 ____ ____   ____

Which sum occurs most often? ☐

How many times does it occur? ☐

Is this a **magic square?** ☐

2

4	3	8	→ ____
9	5	1	→ ____
2	7	6	→ ____

____ ____ ____   ____

Which sum occurs most often? ☐

How many times does it occur? ☐

Is this a **magic square?** ☐

3

1	8	6	→ ____
3	5	7	→ ____
4	9	2	→ ____

____ ____ ____   ____

Which sum occurs most often? ☐

How many times does it occur? ☐

Is this a **magic square?** ☐

4

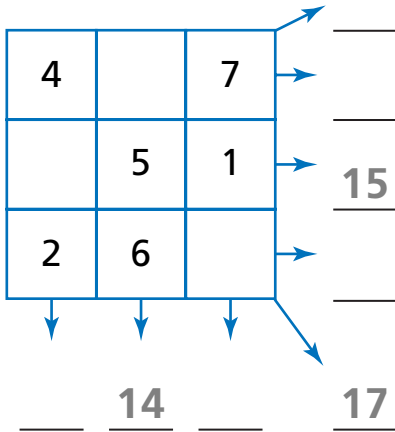| 1 | 2 | 3 | → ____ |
| 4 | 5 | 6 | → ____ |
| 7 | 8 | 9 | → ____ |

____ ____ ____   ____

Which sum occurs most often? ☐

How many times does it occur? ☐
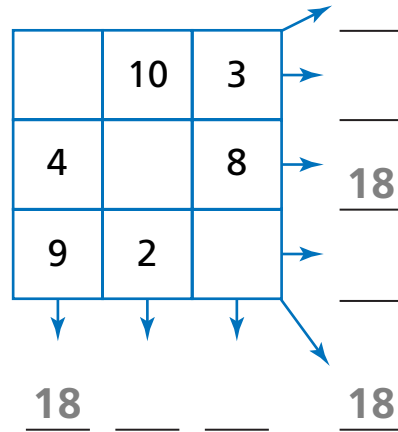
Is this a **magic square?** ☐

Which arrays are magic squares? Score each array by finding all the sums, seeing which sum occurs most often, and counting the number of times that sum occurs.

5

4		7	→ ___
	5	1	→ 15
2	6		→ ___

___ 14 ___ 17

Score: [ ] **Magic?** [ ]

6

	10	3	→ ___
4		8	→ 18
9	2		→ ___

18 ___ ___ 18

Score: [ ] **Magic?** [ ]

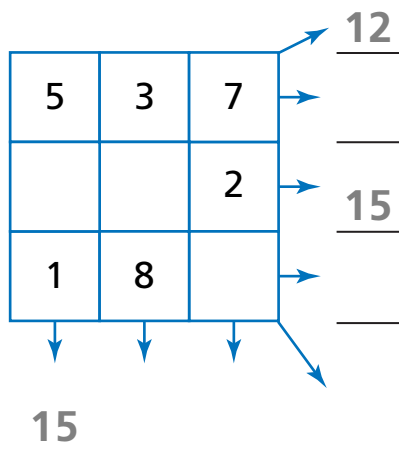**7** Moniqua says she can make a magic square by adding ten to each of the numbers in a magic square. Do you agree or disagree? Explain your answer using numbers, pictures, or words.

_____

_____

8 Challenge

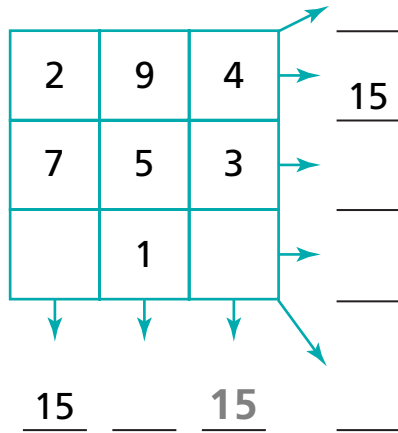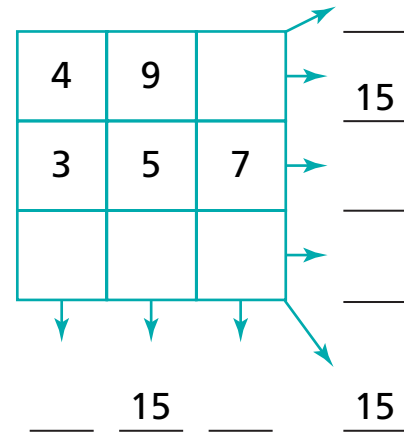| 5	3	7	→ 12
		2	→ ___
1	8		→ 15

15 ___ ___ ___

Score: [7]

Magic? [ ]

Completing Magic Squares

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

Complete the magic squares so that each row, column, and diagonal has the same sum.

①

2	9	4
7	5	3
	1	

→ ____
→ 15
→ ____
→ ____

↓ 15   ↓ ____   ↓ 15   ↓ ____

②

4	9	
3	5	7

→ ____
→ 15
→ ____
→ ____

↓ ____   ↓ 15   ↓ ____   ↓ 15

③

6		8
	5	
2		4

→ ____
→ ____
→ ____
→ ____

↓ ____   ↓ ____   ↓ 15   ↓ ____

④

8	1	6
3	5	
		2

→ ____
→ ____
→ 15
→ ____

↓ ____   ↓ ____   ↓ ____   ↓ ____
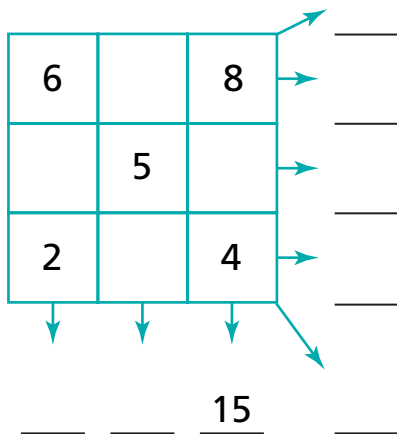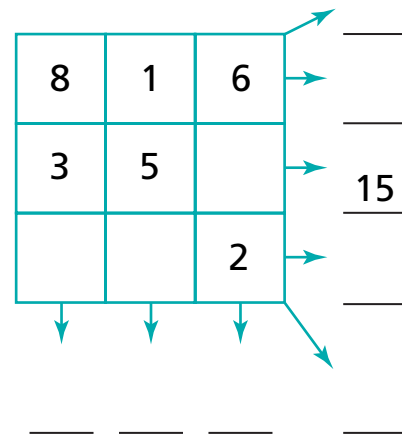
Complete these magic squares so that each row, column, and diagonal has the same sum.

5

12	27	
33		9
18	15	

____
____
____
____

____ ____ ____   ____

6

18	15	
33		9
12	27	

____
____
____
____

____ ____ ____   ____

7

	12	
0	24	48
30		6

____
____
____
____

____ ____ ____   ____

8

30	36	6
42		18

____
____
____
____

____ ____ ____   ____

9 Challenge Make your own magic square using the numbers 2 through 10 so that each row, column, and diagonal has a sum of 18.

	6	

18
____
____
____

____ ____ ____   ____

Name _____ Date/Time _____

How Many Marbles?

Complete each table.

1

Suppose you have 20 marbles.	
If you put ■ marbles into Box A,	then you put ■ marbles into Box B.
15	5
5	
10	
11	
3	
0	
	18
	6
4	
	7
	12

2

Suppose you have 50 marbles.	
If you put ■ marbles into Box A,	then you put ■ marbles into Box B.
10	
20	
	25
	48
	9
45	
12	
	26
17	
	13
0	

3 Lily invites 25 friends to her house to play marble games. She invites 12 boys. How many girls does Lily invite? Explain how you found your answer.

_____

_____

Suppose that you have 12 marbles, and put them into Box A and Box B. Write all the possible addition sentences for the following:

Box A	Box B	Total Marbles

4

5 How do you know you wrote all the possible addition sentences?

_____

_____

6 **Challenge** Jill has some number of marbles. She puts them into the two boxes, and graphs the point that shows the number of marbles in each box.

A How many marbles does Jill have?

_____ marbles

B Find another arrangement of the marbles in the two boxes and graph the point.

MARBLE GRAPH

Number of Marbles in Box B (y-axis: 0–9)
Number of Marbles in Box A (x-axis: 1–9)

Point plotted at (2, 6)

Chapter 3
Lesson 4
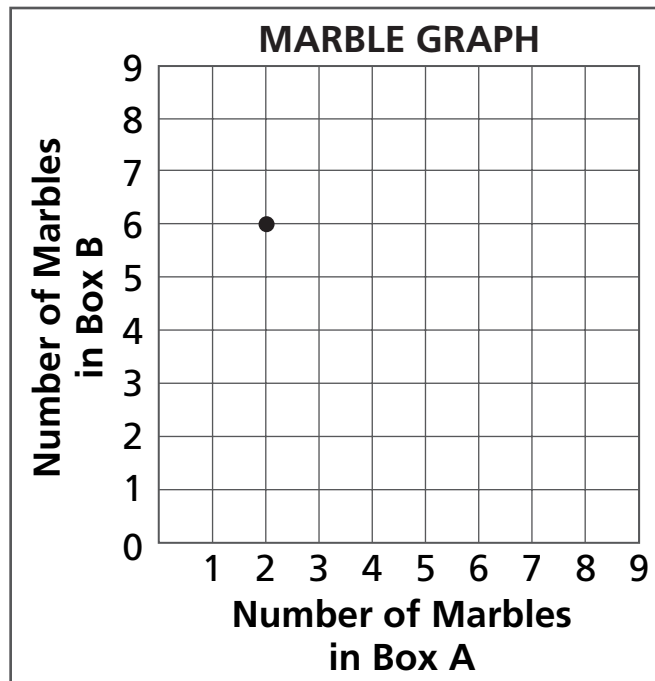
Reasoning About Money

NCTM Standards 1, 2, 6, 7, 8, 10

Gabe has a dime bank with 4 dimes in it. He receives some dimes for his birthday. He puts all the dimes he receives into his dime bank.

1 If he receives:

____1____ dime, then he has ___50¢___ in the bank.

____3____ dimes, then he has _____ in the bank.

_____ dimes, then he has ___60¢___ in the bank.

2 Record some of the possibilities in the table.

If he receives ■ dimes,	1	3		5	4		8	7	9		
then he has ■¢ in his bank.	50		60			100				140	240

3 Can you find the total number of possibilities? Explain.

_____

_____

_____

Sam has some pennies. Kevin has 4 more pennies than Sam. Andrew has twice as many pennies as Sam.

4 Complete the table.

If Sam has ■¢ . . .	1	2						
. . . then Kevin has ■¢ . . .			7		10		17	
. . . and Andrew has ■¢			8		20			50

5 Who has the smallest amount of money? _____

✏ **6** Who has the largest amount of money? Explain.

_____

_____

_____

_____

_____

_____

_____

7 Challenge Judy has 8¢ more than Kari. Kari has half as much money as Lea. Lea has the same amount of money as Judy. How much money does each girl have?

| Judy | Kari | Lea |

Name _____ Date/Time _____

Drawing Conclusions

NCTM Standards 1, 2, 5, 6, 7, 8, 10

Joel has 3 coins in his hand. None of the coins are worth more than a dime.

1 Complete the table to find all the possible coin combinations.

Dimes	Nickels	Pennies	Amount (in cents)
3	0	0	
2	1	0	
2	0	1	

2 The largest amount of money Joel could have is _____¢.

3 The smallest amount of money Joel could have is _____¢.

4 There are _____ different amounts that can be made from 3 coins when none of them are worth more than a dime.

5 List all the different coin combinations worth 26¢.

Quarters	Dimes	Nickels	Pennies	Amount (in cents)

6 **Challenge** Amy has 26¢. She does not have 26 coins. What can you say about this situation?

_____

_____

_____

Chapter 3
Lesson 6 ## Using the Fewest Coins
NCTM Standards 1, 2, 6, 7, 8, 9, 10

1 Make 14¢ in as many ways as possible. You may not need all the rows.

D	N	P	Number of Coins
0	0		
0	1		
0	2		
1			

What is the smallest number of coins needed to make 14¢?

_____ coins

2 Make 18¢ in as many ways as possible. You may not need all the rows.

D	N	P	Number of Coins
0	0	18	18
0	1	13	14
0	2	8	
0	3		
1			

What is the smallest number of coins needed to make 18¢?

_____ coins

3 Show how to make each amount using the fewest coins.

	D	N	P
7¢	0	1	
16¢			
20¢			
24¢			

Solve each problem. You can use quarters, dimes, nickels, and pennies.

4 Tran has two coins of one kind and two coins of a different kind. What is the largest amount of money he could have? Explain.

_____

5 Sue has 1 quarter, 1 dime, and 2 pennies. She exchanges some coins and now has five coins that total the same amount of money. What are Sue's five coins?

_____

6 Devi has 64¢.

What is the largest number of pennies he could have?   _____

What is the largest number of nickels he could have?   _____

What is the largest number of dimes he could have?   _____

What is the largest number of quarters he could have?   _____

7 **Challenge** Jenny has 4 coins. She cannot make the same amount of money with fewer coins.

Could she have 40¢? Explain your thinking. _____

_____

Could she have 56¢? Explain your thinking. _____
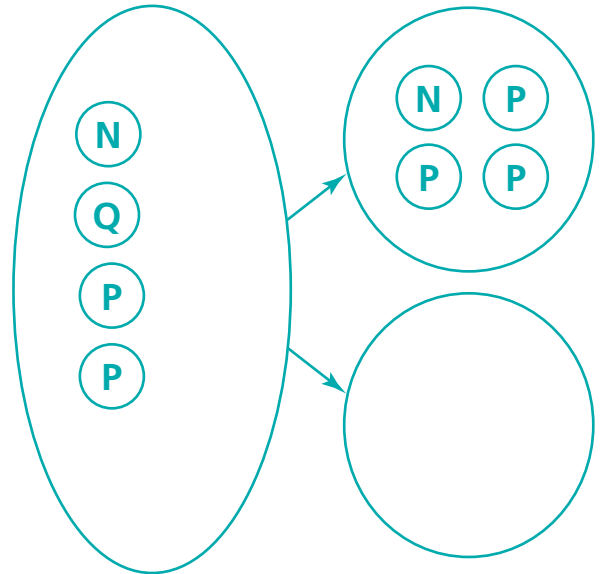
_____

Chapter 3

Lesson 7

Adding and Subtracting with Coins

Complete the addition and subtraction diagrams and number sentences. Show each sum or difference with the fewest coins.
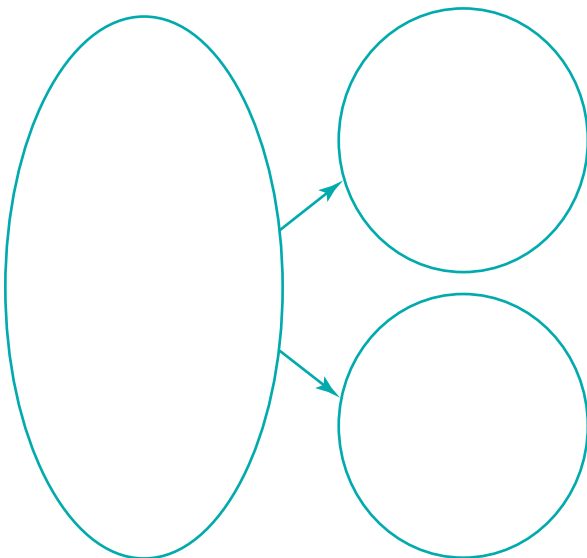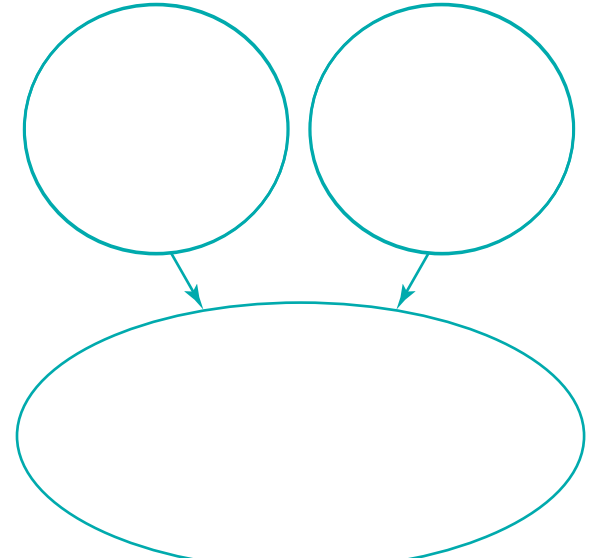
1

| 32¢ | 8¢ | |

Q P
N P

N P
P P

2

| 32¢ | 8¢ | |

N
Q
P
P

N P
P P
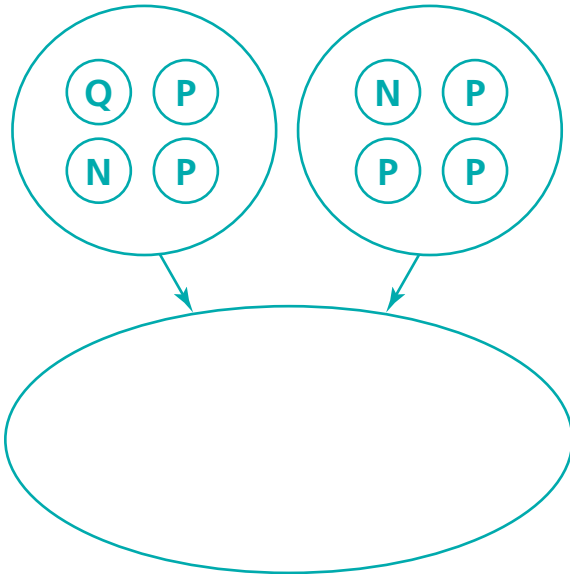
3

| 30¢ | 21¢ | |

4

| 30¢ | 21¢ | |

Complete the addition and subtraction diagrams. Show each sum or difference with the fewest coins.

5

Circle	Value
Q P P D	37¢
D D P P	22¢
D P P P	☐

6

Q Q Q Q

Q N P P ☐

Q N P P P P ☐
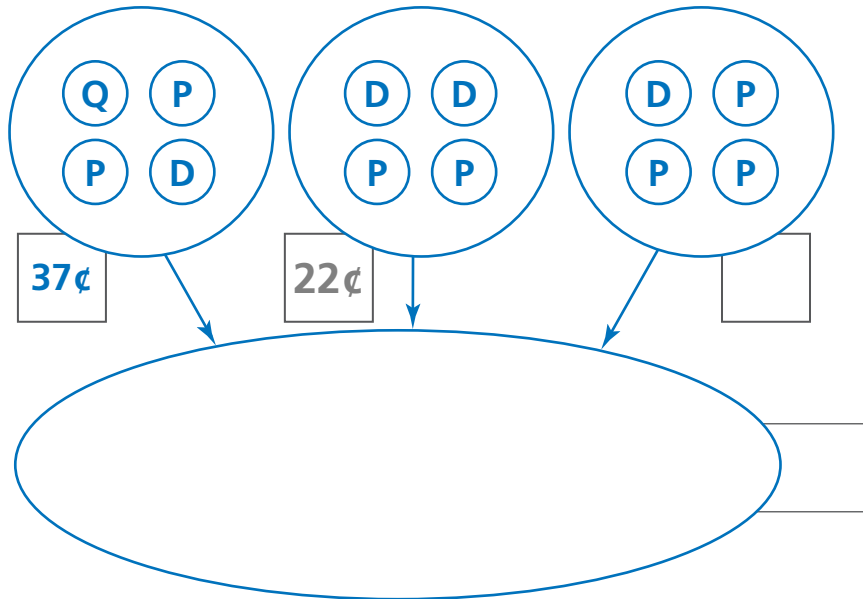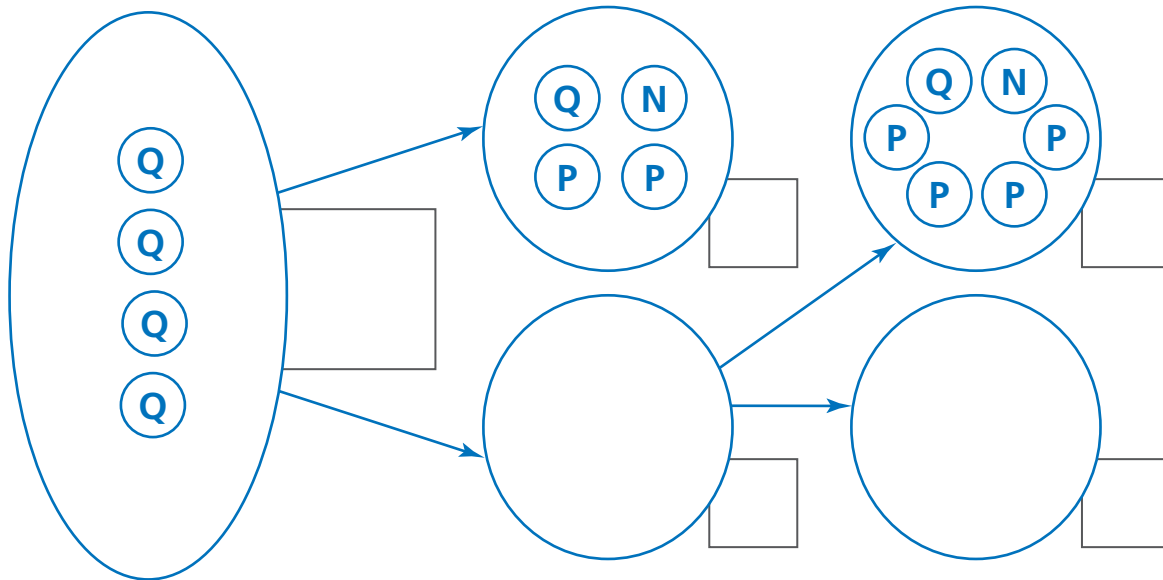
7 Challenge Mara has 3 coins. She trades them all for 2 coins, but she has the same amount of money. Describe a trade that Mara could have made.

_____

_____

Name _____   Date/Time _____

Estimating Sums and Differences

NCTM Standards 1, 6, 7, 8, 9

Circle the correct answer.

1
```
    34
    11
```
A. 35   **C.** 44

B. 41   **D.** 45

2
```
    28
    37
```
A. 55   **C.** 58

B. 57   **D.** 65

3 193   90

A. 100   **C.** 183

B. 103   **D.** 283

4 200   375

A. 175   **C.** 575

B. 500   **D.** 695

5 363   72

A. 200   **C.** 311

B. 291   **D.** 415

6 497   49

A. 500   **C.** 550

B. 546   **D.** 600

7 Someone made a mistake!

```
    47
    38
    85
```

A   What mistake was made?

_____

_____

B   What is the correct answer? _____

Circle the correct answer.

TOY SALE

puzzles 18¢
models 14¢
games 27¢

Tony bought a model and a puzzle. He gave the clerk $1.00.

8 How much did Tony spend?

    A. 22¢

    B. 32¢

    C. 41¢

    D. 45¢

9 How much change did Tony get?

    A. 12¢

    B. 32¢

    C. 68¢

    D. 78¢

Mona bought 2 games, 2 puzzles, and 3 models. She received 3 pennies, 1 nickel, and 1 dime as change.

10 How much did Mona spend?

    A. 98¢

    B. $1.18

    C. $1.22

    D. $1.32

11 How much did she give the clerk?

    A. $1.17

    B. $1.35

    C. $1.50

    D. $1.60

Lester spent 36¢.

12 How much more did Mona spend than Lester?

    A. 90¢

    B. 96¢

    C. $1.00

    D. $1.04

13 **Challenge**
What did Lester buy?

    A. 2 puzzles

    B. 2 models

    C. 2 games

    D. 1 of each item

Name _____ Date/Time _____

Problem Solving Strategy
Work Backward
NCTM Standards 1, 2, 6, 7, 8, 9, 10

Understand
Plan
Solve
Check
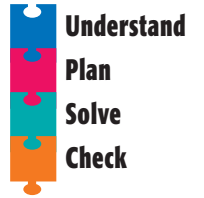
1 Complete the diagram.
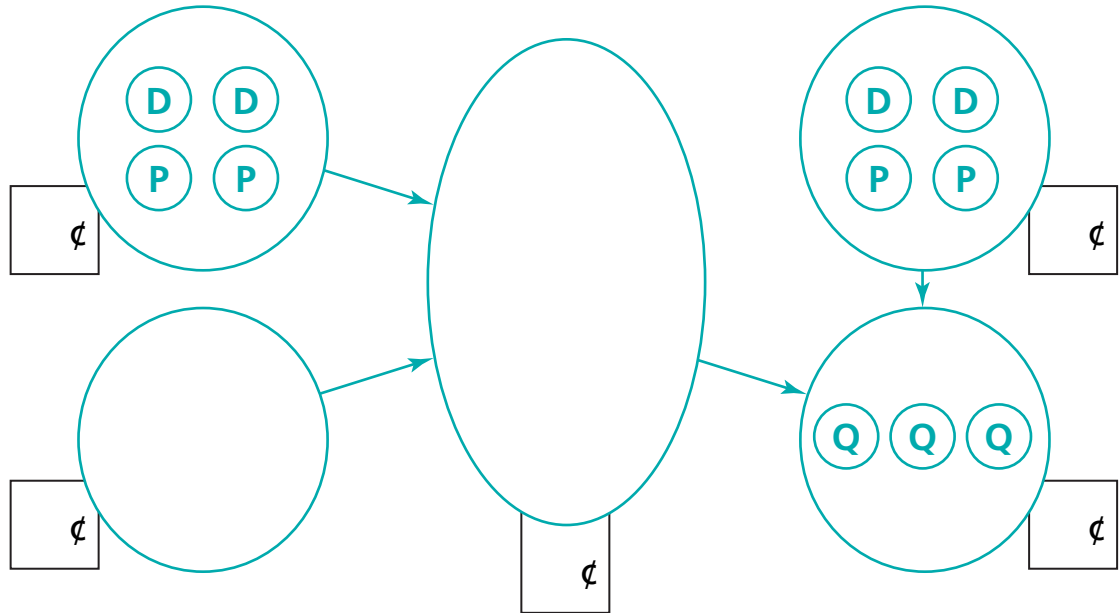
Solve each problem.

2 Blake had some coins worth 45¢. He traded 6 of those coins for a dime. After the trade, he had the fewest possible coins to make 45¢. What coins did Blake start with?

_____

3 Jan put some marbles in a blue box. She put the same number of marbles in a green box. Finally, she moved 5 marbles from the green box over to the blue box. If the blue box now has 18 marbles, how many marbles are in both boxes?

_____ marbles

Problem Solving Test Prep

Choose the correct answer.

1 Mr. Jones is putting new strings on 7 guitars at his store. He uses 6 strings for each guitar. How many strings will he use in all?

A. 6 strings

B. 13 strings

C. 42 strings

D. 48 strings

2 Which of the multiplication facts below can be used to find the missing number?

50 ■ 10

A. 2　10　20

B. 10　5　50

C. 10　10　100

D. 10　50　500

3 Kenny used square tiles to model a number sentence.

What number sentence did he model?

A. 9　2　18

B. 5　5　5　15

C. 3　6　18

D. 6　6　36

4 Which is the missing factor?

10　(2　■)　80
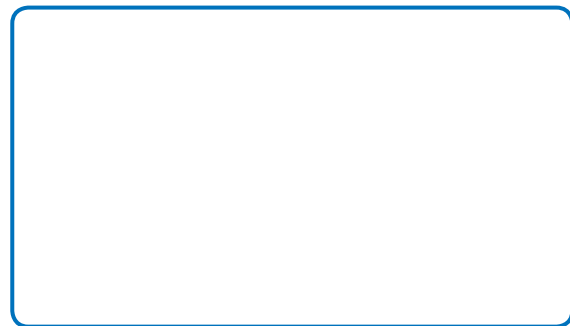
A. 1　　　　**C.** 3

B. 2　　　　**D.** 4

Show What You Know

Solve the problem. Explain your answer.

5 Chase made this pattern with counters.

Draw the next figure in Chase's pattern. Explain how you know your answer is correct.

_____

_____

_____

2　2　2　2　2　2

Chapter 3 Review/Assessment

NCTM Standards 1, 2, 6, 7, 8, 9, 10

Complete the magic squares. Lesson 2

1

			→ 27
10		6	→ ___
5	9		→ ___
			→ ___

___ ___ ___   ___

2

			→ ___
	4	5	→ ___
2			→ ___
7		3	→ ___

___ 18 ___ ___

---

3 Complete the table. Lesson 3

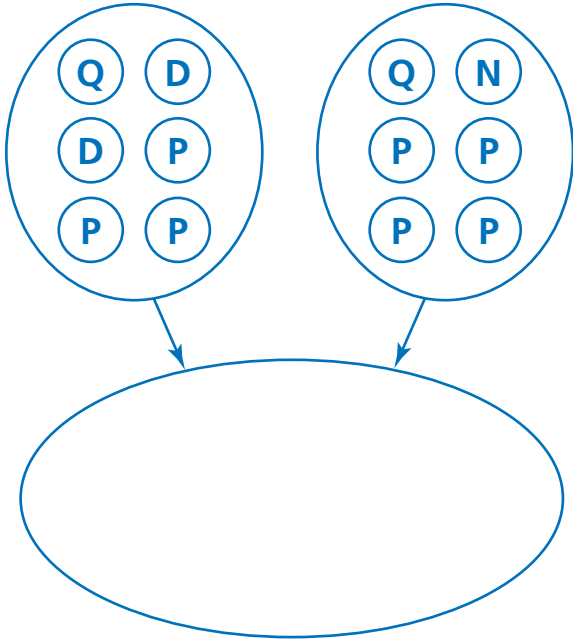| I have 36 green and blue marbles.	
If ■ marbles are green,	then ■ marbles are blue.
10	
	15
31	
22	
	13
	18
	6
1	
0	

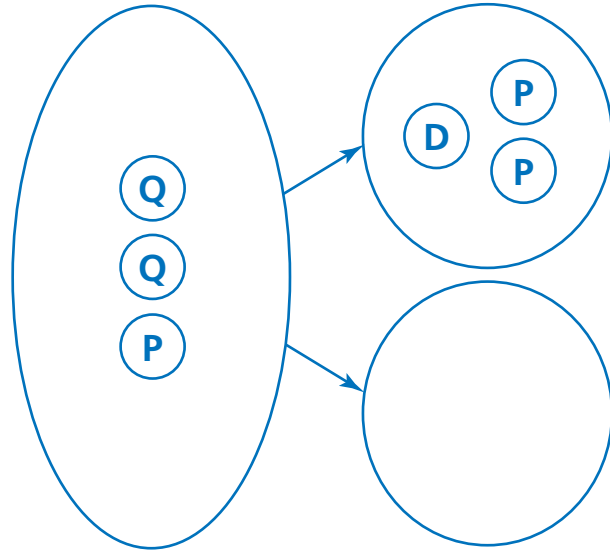**4** Find all the ways to make 23¢. What are the fewest coins needed to make 23¢? Lesson 6

_____ coins

D	N	P	Number of Coins
0	0		23

Complete the addition and subtraction diagrams and number sentences. Show each sum or difference with the fewest coins. Lesson 7

5 ☐ ☐ ☐

(Q) (D)
(D) (P)
(P) (P)

(Q) (N)
(P) (P)
(P) (P)

6 ☐ ☐ ☐

(Q)
(Q)
(P)

(D) (P)
(P)

---

7 Shane had 3 coins worth 40¢. He traded the coin with the greatest value for 2 dimes and 1 nickel. He traded the coin with the least value for 5 pennies. What coins did Shane start with? Lesson 9

_____

Circle the correct answer. Lesson 8

8 43
      28
      ───

A. 15
B. 25
C. 61
D. 71

9 73
      37
      ───

A. 34
B. 44
C. 100
D. 110