Chapter 3

Lesson 1

Name _____ Date _____

Investigating Mystery Number Puzzles

NCTM Standards 1, 6, 7, 8, 10

Solve the puzzles. The boxes next to the clues show you the number of digits in the solution.

Clues	Workspace
1 Puzzle A ☐ 25 is one of its 6 factors ☐ Sum of the digits is a multiple of 5 ☐☐	
2 Puzzle B Multiple of 8 less than 7 × 8 ☐ Sum of the digits is even ☐ Ones digit is 4 more than the tens digit ☐☐	
3 Puzzle C ☐ Product of the digits = 15 ☐ Sum of the digits = 8 ☐☐	
4 Puzzle D ☐ Multiple of 12 greater than 12 × 8, but less than 12 × 13 ☐ Sum of the digits is not 9 ☐ Tens digit is double the hundreds digit ☐☐☐	

Clues	Workspace

5 Puzzle E

- ☐ Square number greater than 0 × 0, but less than 10 × 10
- ☐ Even
- ☐ Sum of the digits is even
- ☐ Tens digit is 2 more than the ones digit

☐☐

6 Puzzle F

Write clues for your own Mystery Number Puzzle. Solve your puzzle.

- ☐ _____
- ☐ _____
- ☐ _____

☐☐

7 Challenge Puzzle G

- ☐ 25 is a factor
- ☐ Less than 250
- ☐ Multiple of 10
- ☐ Multiple of 3

☐☐☐

Chapter 3
Lesson 2

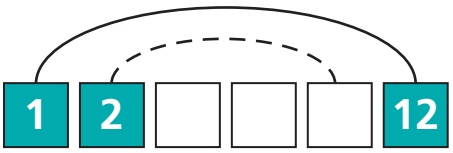
Name _____ Date _____

Factoring

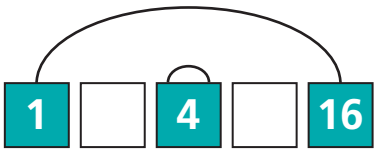
NCTM Standards 1, 2, 6, 8, 10

Write all the factors of each product in the diagram. Connect pairs of factors as shown.

1. 12

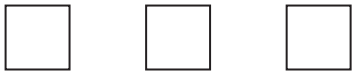


2. 16



3. 30

4. 25



Solve the problem.

5. Lynn baked 24 cookies. How many cookies will each child get if there are

8 children? _____ 4 children? _____ 12 children? _____

3 children? _____ 6 children? _____ 2 children? _____

Explain a pattern you see in the number of children and the number of cookies.

_____

_____

_____

List as many factors of each product as you can.

6. 34

7. 42

8. 35

9. 55

10. Explain how you found the factors of 42 in Problem 7. Use diagrams, numbers, or words in your explanation.

11. **Challenge** Solve the puzzle.

- ☐ A factor of 500
- ☐ A multiple of 20
- ☐ A multiple of 25
- ☐ Greater than 400 _____

Explain how you found the answer using diagrams, numbers, or words.

Chapter 3

Lesson 3

Name _____ Date _____

Finding Common Factors

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

- **To solve these puzzles, you may need to make more than one list of numbers.**
- **Read all the clues for each puzzle before you begin.**
- **The boxes next to the clues show you how many digits the number has.**

Clues **Workspace**

1 Puzzle A

☐ Less than 30

☐ Even

☐ Product of the digits does not equal 8

☐ Sum of the digits = 3

☐☐

2 Puzzle B

☐ Odd

☐ Factor of 36

☐ Not a factor of 48

☐ A square number

☐

3 Which clue in Puzzle B is unnecessary? Explain why the clue is unnecessary.

_____

_____

4 Puzzle C

☐ Sum of the digits = 9

☐ Common factor of 54 and 90

☐☐

There may be more than one possible answer to these puzzles. Find as many possibilities as you can.

Clues	Workspace

5 Puzzle D

- ☐ Common multiple of 6 and 9 less than 90
- ☐ Tens digit is less than the ones digit
- ☐ Product of the digits is a 1-digit number

☐☐

6 Puzzle E

- ☐ Common factor of both 66 and 99
- ☐ Sum of digits is a factor of 12
- ☐ Product of digits is a square number

☐☐

7 Julie bakes bread every fourth day. She bakes muffins every fifth day. If she bakes both bread and muffins today, in how many days will she bake both bread and muffins again? Explain how you know.

_____

_____

_____

8 Challenge Puzzle F

- ☐ 3-digit common multiple of 4 and 20
- ☐ Greater than 10×20, but less than 17×20
- ☐ Sum of the digits is even
- ☐ Product of the digits $= 0$
- ☐ Sum of the digits $= 10$

☐☐☐

Chapter 3

Lesson 4

Name _____ Date _____

Investigating Prime and Composite Numbers

NCTM Standards 1, 2, 6, 8, 10

List the factors and draw lines to connect factor pairs. Write *P* for prime, *C* for composite, or *N* for neither.

	Number	Factors	P, C, or N
1	8		
2	19		
3	30		
4	1		
5	42		
6	29		

7 What is the only even prime number? Use a diagram to explain how you know the number is prime.

List the factors for each number. Then list any common factors for the two numbers. Circle the greatest common factor.

Example

27	18
1 3 9 27	1 2 3 6 9 18

Common Factor(s): 1, 3, (9)

8

12	48

Common Factor(s): _____

9

36	60

Common Factor(s): _____

10 Thomas is packaging trading cards to give to his friends. He is going to give away 45 baseball cards and 36 football cards. Each package will have one kind of card and all the packages will have the same number of cards. What different ways can Thomas package the trading cards? Explain how you solved the problem.

_____

_____

11 Challenge

Find two composite numbers that do not have any common factors other than 1. _____ _____

Chapter 3

Lesson 5

Name _____ Date _____

Writing a Number as the Product of Prime Factors

NCTM Standards 1, 2, 6, 8, 10

For each problem:

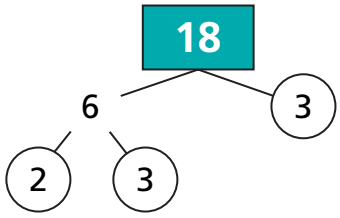
A. Draw one factor tree and circle the prime factors.

B. Draw a different factor tree by starting with two different factors.

C. Write number sentences with the prime factors.

D. What do you notice?

1



18 $2 \times 3 \times 3$

18 _____

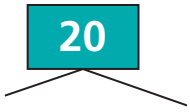
2

12 _____

12 _____

3

20 _____



20 _____

4 For Problem 3, how do the two number sentences you wrote for 20 compare?

_____

_____

For each problem:

A. Draw a factor tree and circle the prime factors.

B. Write a number sentence with the prime factors.

5 **14**

14 _____

6 **45**

45 _____

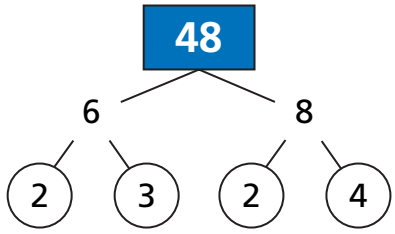
7 **24**

24 _____

8 **100**

100 _____

9 Whitney made this factor tree for 48. Describe and correct her error.



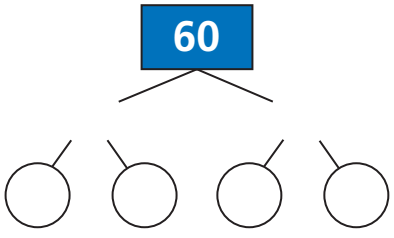
_____

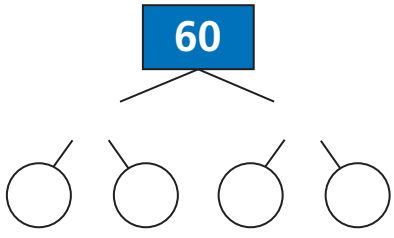
_____

_____

_____

10 Challenge Fill in the trees in different ways. Prime factors must be in the circles.





Chapter 3
Lesson 6

Name _____ Date _____

Investigating Divisibility by 2, 5, and 10

NCTM Standards 1, 2, 7, 8

Solve the Mystery Number Puzzles.

Clues		Workspace
1 Puzzle A		
☐ Divisible by 10		
☐ Less than 300		
☐ Multiple of 11		
☐ Sum of the digits 4	☐☐☐	
2 Puzzle B		
☐ Divisible by 2		
☐ Less than 700, but greater than 680		
☐ Not divisible by 10		
☐ Sum of the digits 23	☐☐☐	
3 Puzzle C		
☐ Divisible by 5 and 2		
☐ Less than 500		
☐ Sum of the digits 12		
☐ At least one digit is odd	☐☐☐	
4 Puzzle D		
☐ Divisible by 5		
☐ Multiple of 50		
☐ Sum of the digits is a multiple of 5	☐☐☐	

To solve these puzzles, you may need to think about more than one clue at a time.

Clues	Workspace

5 Puzzle E

- ☐ Divisible by 10
- ☐ Greater than 200, but less than 300
- ☐ Sum of the digits is a multiple of 3
- ☐ Sum of the digits is even

☐☐☐

6 Write a word problem with an answer that is a number divisible by 2, 5, and 10. Show the solution.

_____

_____

_____

7 The number on Tyler's locker is divisible by 2, 5, and 10. Which of these is Tyler's locker? Explain.

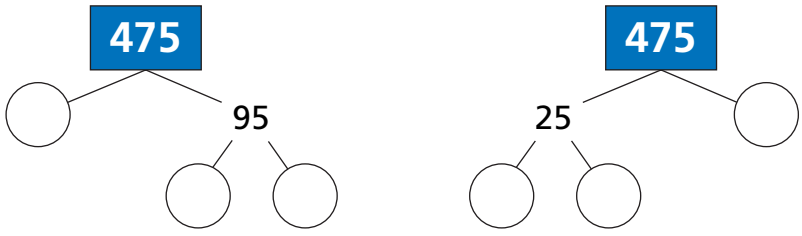
254	255	256	257	258	259	260	261

_____

_____

_____

8 Challenge Fill in the trees in different ways. Prime factors must be in the circles.



Chapter 3

Lesson 7

Name _____ Date _____

Investigating Divisibility by 3, 6, and 9

NCTM Standards 1, 2, 7, 8

Solve the Mystery Number Puzzles.

Clues		Workspace
1 Puzzle A ☐ Multiple of 5 ☐ Divisible by 3 ☐ Greater than 495, but less than 525	☐☐☐	
2 Puzzle B ☐ Divisible by 9 ☐ Multiple of 2 ☐ Greater than 312, but less than 336	☐☐☐	
3 Puzzle C ☐ Divisible by 6 ☐ Multiple of 7 ☐ Greater than 224, but less than 266	☐☐☐	

4 Matt says that every number that is divisible by 3 is also divisible by 6. Do you agree or disagree? Explain.

_____

_____

_____

5 Is the number divisible by 3? Write *yes* or *no.*

63 _____ **460** _____ **1,003** _____

6 Is the number divisible by 9? Write *yes* or *no.*

171 _____ **472** _____ **1,323** _____

7 Is the number divisible by 6? Write *yes* or *no.*

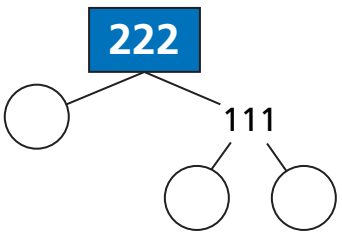
102 _____ **303** _____ **870** _____

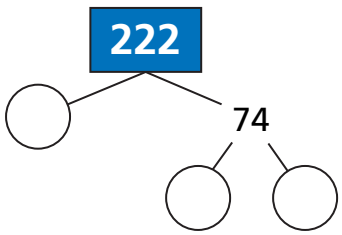
201 _____ **558** _____ **735** _____

8 Write other numbers that are divisible by 3, 6, and 9.

Divisible by 3	Divisible by 6	Divisible by 9
_____ _____	_____ _____	_____ _____

9 Fill in the trees in different ways.
Prime factors must be in the circles.





10 **Challenge** Write *yes* or *no* and tell why.
Can 300 paper clips be divided among

3 students? _____ Why? _____

6 students? _____ Why? _____

_____

9 students? _____ Why? _____

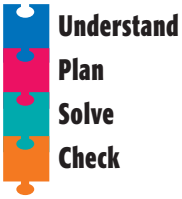
Chapter 3
Lesson 8

Name _____ Date _____

Problem Solving Strategy

Guess and Check

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



Solve. Show your work.

1 Randi wrote clues for a Mystery Number Puzzle. Solve her puzzle.

- ☐ Multiple of 5
- ☐ Hundreds digit is 1
- ☐ Even
- ☐ Sum of the digits is greater than 9

☐☐☐

2 There are 150 fifth graders who will participate in field-day events. All the students can be put on 2-person teams with no student left out.

Name all the other sizes of teams that all students can join with no one left out. All the teams must have the same number of students.

_____

_____

_____

Write any number that matches the clue. You might list a few other possible numbers in the workspace on the right.

3 3-digit multiple of 3 and 5 ☐☐☐

4 4-digit multiple of 3, but not 6 ☐,☐☐☐

5 5-digit multiple of 9 and 10 ☐☐,☐☐☐

Problem Solving Test Prep

Choose the correct answer.

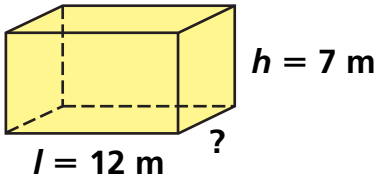
1 What are lines called that are intersecting and form right angles?

A. intersecting lines
B. perpendicular lines
C. rays
D. right angles

2 Paulo has 28 shells to display in groups on a table. He wants each group to have the same number of shells. How many different ways can he arrange the shells?

A. groups of 1, 2, 3, 4, 5, 6, or 7
B. groups of 1, 2, 4, 7, 14, or 28
C. groups of 1, 2, 3, 7, 9, or 27
D. groups of 1, 2, 7, 14, 21, or 28

3 The volume of the rectangular prism is 756 cubic meters. What is the measure of the missing dimension?



A. 9 meters
B. 7.5 meters
C. 7 meters
D. 6.5 meters

4 Which is the side view of a cube?

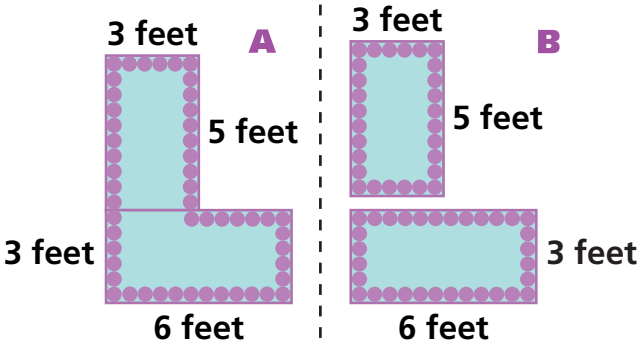
A. 
C. 
B. 
D. 

Show What You Know

Solve each problem. Explain your answer.

5 Min is standing in line at the amusement park to ride a roller coaster. He counts 47 people in front of him in line. Each car holds 5 passengers. If each car before his is filled to capacity, in which car will Min ride? Explain how you know.

6 The diagram shows the decorative border Kim glued around the outer edge of each arrangement of tables.



Which arrangement needed more border? How much more? Explain.

Chapter 3

Name _____ Date _____

Review/Assessment

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

Solve the Mystery Number Puzzles. Show your work. Lessons 1 and 3

1 Puzzle A

- ☐ Common multiple of 3 and 5
- ☐ Less than 150
- ☐ Odd
- ☐ Tens digit is even

☐☐☐

2 Puzzle B

- ☐ Common factor of 21 and 70
- ☐ Prime number
- ☐ Odd

☐

Tell whether 1005 students can be put into equal groups with these numbers of students. Write *yes* or *no*. Lessons 6 and 7

3 2 students _____ 4 3 students _____ 5 5 students _____

6 6 students _____ 7 9 students _____ 8 10 students _____

List the factors of each number. Then list any common factors. Lessons 2, 3, and 4

9 **15**

1, 15

10 **40**

11 Common factor(s) of 15 and 40 _____

12 **48**

13 **36**

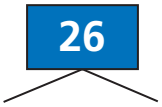
14 Common factor(s) of 48 and 36 _____

Draw a factor tree and circle the prime factors. Write a number sentence with the prime factors. Lessons 4 and 5

15

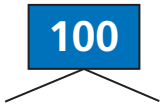
28 _____

16



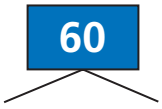
26 _____

17



100 _____

18



60 _____

Write 3 prime numbers. Use pictures, numbers, or words to explain how you know the numbers are prime. Lesson 5

19 _____ _____ _____ _____

Solve the problem. Lesson 8

20 Alex has 100 trading cards that he wants to put in stacks with the same number of cards in each stack and no cards left over. List all the ways he can stack the cards. Use pictures, numbers, or words to explain your answer.

_____

_____

_____

_____

_____