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# INTRODUCTION

## **DESCRIBE *CROSS-NUMBER DISCOVERY PUZZLES & GAMES 4*.**

Learning math is a lot like doing a jig-saw puzzle. Every well placed jig-saw piece helps you place the next piece, and every well learned math concept helps you learn the next concept. The *Cross-Number Discovery Puzzles and Games* series helps you put the math pieces into place. It begins with the earliest number concepts and follows a developmental framework to grow math understanding one concept at a time. And it does this in a fun way through puzzles and games.

*Cross-Number Discovery Puzzles and Games 4* consists of 40 cross-number puzzles and over 60 corresponding games. The puzzles and games involve early number concepts and are cumulative in nature. Each group of five puzzles and games has similar learning outcomes. This means that the outcomes in 1-5 are the same, the outcomes in 6-10 are the same and so on. Each group of five introduces new pieces of learning. This helps put the math pieces into place.

However, learning math is different than doing a jig-saw puzzle in that once a math concept is introduced, it has to be practiced in order that it stays in place. Each group of five puzzles and games reinforces the number concepts, strategies and skills introduced in earlier puzzles. This helps keep the math pieces in place.

For each group of five puzzles there is an overview and an assessment sheet. For the accompanying games there is an introductory sheet. In the puzzles, new concepts, strategies and skills are often introduced by two questions connected by a bracket. One of the questions is a helper question and can involve a model such as a number line or an array.

For each group of five puzzles there are accompanying games. These games provide practice on the number concepts introduced in the group of five puzzles. The rules for the games are simple and easy to follow and require little explanation. They include games such as: 'I have.., who has..?', bingo games and card games.

## **WHAT IS THE INTENDED GRADE LEVEL?**

This is the fifth resource in the *Cross-Number Discovery Puzzles & Games* series, following *Cross-Number Discovery Puzzles & Games 3*. *Cross-Number Discovery Puzzles & Games 4* is intended for children in Grade 4. However, the puzzles are also suitable for children in higher grades who are still working on the number concepts introduced in this resource.

## **HOW WERE THE PUZZLES & GAMES CHOSEN?**

The puzzles and games are mainly based on the following volume: *Teaching Number: Advancing Children's Skills and Strategies*, 2<sup>nd</sup> edition, Robert J. Wright, James R. Martland, Ann K. Stafford, Garry Stanger, Sage Publications. In this volume, the authors set forth a comprehensive and integrated learning framework for the assessment, learning and teaching of number concepts.

## **HOW CAN I USE THIS RESOURCE IN MY CLASSROOM?**

Teachers can use this resource with an entire class, small groups, or individual children. As there are a number of books in this series, there is a puzzle at the appropriate level for every child. The resource allows teachers to easily differentiate instruction. Since all puzzles have a similar look, each child in the class can be working on a puzzle that is suitable for him or her. The puzzles as well as the games are all reproducible.

The puzzles are also a tool for parental involvement. Through the puzzles, the parents are introduced to models and strategies that can help them support their children with their math learning.

## **HOW CAN THIS RESOURCE HELP MY STUDENTS?**

Because the puzzles and games introduce number concepts one at a time, it is easy to identify how confident a child is with a particular number concept and whether they need more support. The puzzles provide an excellent diagnostic and assessment tool. Not all children in a class are at the same point in their learning, and these puzzles allow teachers to identify how best to help each child and move him or her forward. The accompanying games also provide additional support.

The structure of the puzzles allows children to know what is expected of them and to be successful with little teacher intervention. This is rewarding for the children and builds their confidence. The puzzles are intended to be engaging and fun and help children discover their ability to do mathematics.

## **ARE THE PUZZLES SELF-CORRECTING?**

Because the questions answer both across and down, the puzzles are often self-correcting. Because of this, some questions like 'an even number' will be answered later in the puzzle. While the puzzles are not entirely self-correcting, they are easy and quick for teachers to correct.

# FOREWORD

I am delighted to provide the foreword for this series of challenging, progressive, reinforcement number puzzles. Celia Baron has ingeniously created puzzles at different levels which utilise the key aspects of the Mathematics Recovery Programme. The Mathematics Recovery Programme provides a comprehensive series of work starting with the identification, analysis and reporting on children's numerical knowledge, skills and strategies. The diagnostic assessments lead to the design, implementation and evaluation of teaching interventions both for individuals, small groups and whole classes in differing organizations and contexts.

The lessons in Mathematics Recovery are intensive and challenging, based at the cutting edge of a child's knowledge. There is a great emphasis on problem solving and verbal interaction as the teacher seeks to ascertain the child's strategies. Equally important are the child's explanations as to how they arrived at a solution and how they know they are correct. This leaves little time in the lesson for reinforcement activities.

The bank of number puzzles created by Celia Baron provides teachers, whether of individuals, small groups, or whole classes, with a valuable reinforcing and self-correcting challenge. Careful selection of the range of puzzles will give the child questions that they should be able to meet whilst at the same time providing enjoyment and intrinsic satisfaction. At the same time the puzzles have an in-built logic where the child can see linkages and associations between key topics and the discussion of the completed puzzle with the teacher will reveal these as well as identifying where more work, or practice, is required.

Celia Baron successfully draws upon the concepts of the Mathematics Recovery Programme, and provides educators with exciting tools. The puzzles include number word sequences both forward and backwards, numeral identification, number problems in the four operations, the use of spatial patterns and the employment of empty number line activities.

The puzzles support learning and are a welcome and innovative addition to the field of mathematics education.

James R Martland  
Director, Mathematics Recovery Programme (UK) Ltd

*Jim Martland is a member of the International Board of Mathematics Recovery and Director of the Mathematics Recovery Programme (UK) Ltd. He is Senior Fellow in the Department of Education at the University of Liverpool. In his long career in primary education he has held headships in primary and middle schools and was Director of Primary Initial Teacher Training. In every post he continued to teach and pursue research in early numeracy and deliver professional development courses in the assessment of children's numerical knowledge and strategies.*



SAMPLE.

# Puzzles

At their own level,  
at their own place,  
but at the same time

## OVERVIEW: PUZZLES 1-5

Puzzles 1-5 are the first group of puzzles in *Cross-Number Discovery Puzzles 4*. The following number concepts, strategies and skills are introduced in this group of five puzzles. The outcomes are listed below as they appear in Puzzle 1.

### ACROSS:

**A. Subtracting involving two 3-digit numbers without regrouping**

**C. Determining the number of cents in pennies and 4 quarters**

A question involving money appears in each puzzle. In this first group of puzzles, these questions involve 4 quarters.

**G. Determining the perimeter**

A question involving perimeter appears in each puzzle. These questions often involve repeated addition and can be solved using multiplication.

**K. Adding two 2-digit numbers with regrouping**

**L. 2-digit numbers in non-canonical forms**

A number in the form 4 tens and 12 ones is referred to as being in non-canonical form. The number 5 tens and 2 ones is referred to as being in canonical form.

**M. Recognizing patterns that increase by 3**

**T. Counting by tens**

**U. 3-digit numbers in non-canonical forms - hundreds and tens**

### DOWN:

**A. Ordering 3-digit numerals**

**B. Determining the numbers of unit squares in visible arrays**

**C. Basic multiplication facts - factors of 2**

**D. Adding two 3-digit numbers without regrouping**

**F. Subtracting from a decade**

**J. Counting by 10s beyond 100, off the decade**

**M. 3-digit numbers in canonical form**

**N. Determining the number of minutes in minutes and 1 hour**

A question involving time appears in each puzzle.

**Q. Determining the hundred a 3-digit number is closest to**

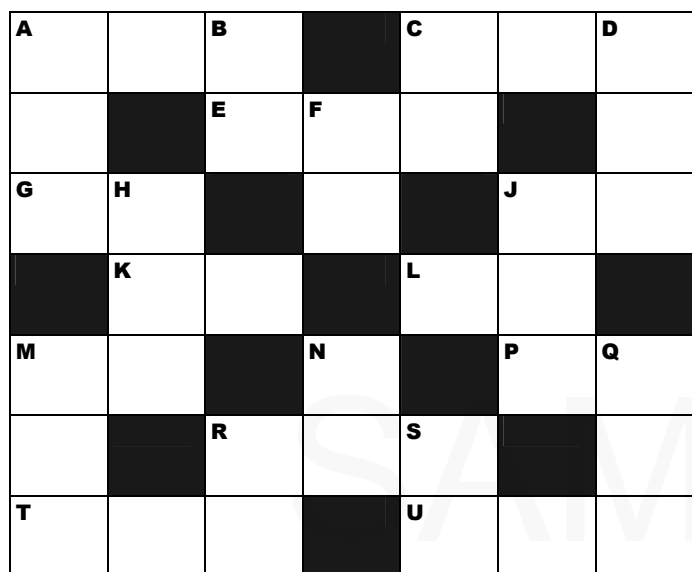
**R. Combining pairs of numbers that add to 10, sum less than 40**

**S. Missing addend tasks involving a 2-digit number and a decade**

At the end of the puzzles, there are **assessment sheets**, which include two checklists for this group of puzzles. The first checklist charts the progress of students as they work through the questions in Puzzle 5, while the second checklist cross-references the questions in Puzzle 5 to the outcomes in *Teaching Number: Advancing Children's Skills and Strategies*, 2<sup>nd</sup> edition. After the **answer keys**, there are the **games**. Refer to section 1-5 of the games for activities that support the learning of the concepts presented in this group of five puzzles.

*Cross-Number Discovery Puzzles 4* focuses on the basic multiplication and division facts. These facts are introduced in a logical rather than a numerical order. Puzzles 1-5 introduce the basic multiplication facts with factors of 2. Students needing more support with these facts can be referred to *Thinking Strategies Multiplication: Building Mastery of Multiplication Facts*. Level 1 of this program deals with these facts.

# CROSS-NUMBER PUZZLE 1



Cross-Number Discovery Puzzles 4 - © Celia Baron 2013

## ACROSS:

A.  $796 - 325$

C. The number of cents in 4 quarters and 6 pennies

E. A number that reads the same backwards and forwards

G. The perimeter of the triangle



J. An odd number

K.  $26 + 26$

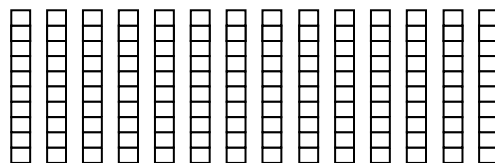
L. The number that means 4 tens and 12 ones

M. The next number in the pattern: 15, 18, 21, 24,

P. A number between 80 and 90

R. A number whose digits add to 4

T. The number shown by the blocks

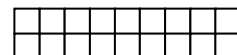


U. The number that means 14 tens

## DOWN:

A. Choose the least number: 543, 453, 553, 455

B. The number of unit squares in the array



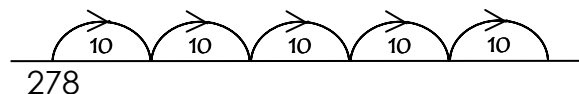
C.  $2 \times 9$

D.  $432 + 265$

F.  $70 - 6$

H. A number with three odd digits

J. The number reached on the last hop



M. Write in standard form:  $200 + 90 + 1$

N. The number of minutes in 1 hour and 30 minutes

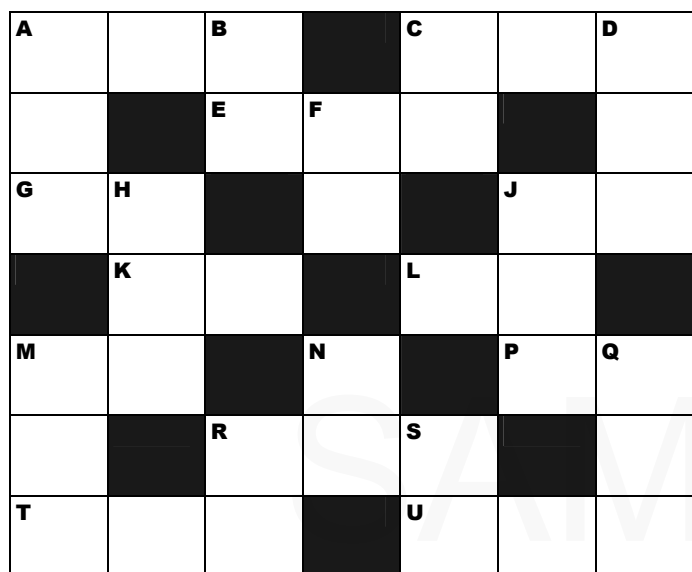
Q. The hundred that 578 is closest to



R.  $7 + 3 + 4 + 6 + 1 + 9$

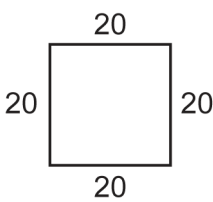
S.  $49 + \square = 60$

## CROSS-NUMBER PUZZLE 2

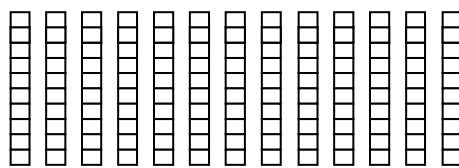


Cross-Number Discovery Puzzles 4 - © Celia Baron 2013

### ACROSS:

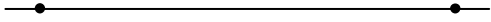
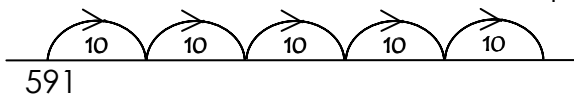
- A.** Write in standard form:  
 $700 + 20 + 1$
- C.** The number of cents in 4 quarters and 1 nickel
- E.** A number with two digits the same
- G.** The number of minutes in 1 hour and 29 minutes
- J.** An even number
- K.** The perimeter of the square
- 
- L.**  $37 + 37$
- M.** The number that means 6 tens and 14 ones
- P.** A number less than 20
- R.** A number between 300 and 400

**T.** The number shown by the blocks



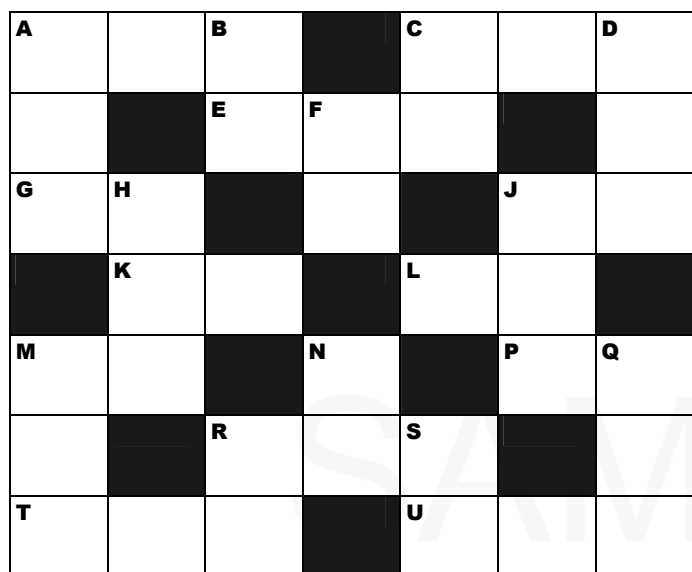
**U.** The number that means 13 groups of ten

### DOWN:

- A.**  $425 + 373$
- B.** The number that means 2 groups of eight
- C.**  $2 \times 8$
- D.** The hundred that 543 is closest to
- 
- F.**  $58 + \square = 70$
- H.** A number whose digits add to 21
- J.** The number reached on the last hop
- 
- M.**  $986 - 235$
- N.** The next number in the pattern:  
36, 40, 44, 48,  $\square$
- Q.** Choose the greatest number:  
780, 807, 708, 870
- R.**  $4 + 6 + 2 + 8 + 7 + 3$
- S.**  $80 - 9$



# CROSS-NUMBER PUZZLE 3



Cross-Number Discovery Puzzles 4 - © Celia Baron 2013

## ACROSS:

A. The number that is 2 less than 200

C. Choose the greatest number:  
738, 837, 783, 873

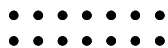
E. A number whose digits add to 15

G.  $60 - 7$

J. The next number in the pattern:  
82, 80, 78, 76,

K. The number of minutes in 1 hour  
and 35 minutes

L. The number of dots  
in the array



M.  $2 \times 7$

P.  $35 + \square = 50$

R.  $503 + 245$

T. The number that means 10 tens

U. The number that means 15 tens

## DOWN:

A. The number of cents in 4 quarters,  
2 dimes and 1 nickel

B.  $58 + 28$

C. The number that means 7 tens  
and 16 ones

D.  $284 + 10 + 10 + 10 + 10$

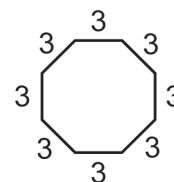
F.  $3 + 7 + 5 + 5 + 8 + 2 + 9$

H. A number between 300 and 400

J. A number with two odd digits

M.  $996 - 865$

N. The perimeter  
of the octagon



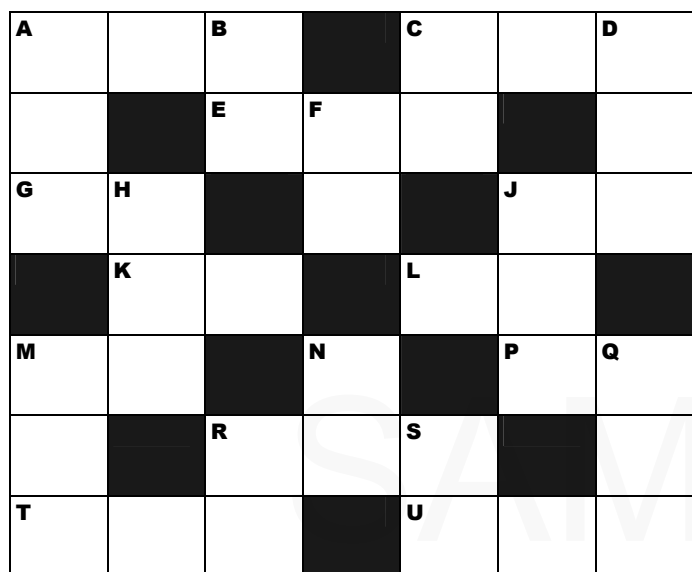
Q. The hundred that 468 is closest to



R. An even number

S. A number between 80 and 90

# CROSS-NUMBER PUZZLE 4



Cross-Number Discovery Puzzles 4 - © Celia Baron 2013

## ACROSS:

A. The number of cents in 4 quarters,  
4 dimes and 3 pennies

C. The number that is two more than 579

E. A number whose digits add to 8

G.  $8 + 2 + 3 + 7 + 1 + 9 + 4$

J. The next number in the pattern:  
48, 51, 54, 57,

K.  $28 + 25$

L. The number that means 4 tens  
and 13 ones

M. The number of minutes in 1 hour  
and 32 minutes

P. A number with both digits the same

R. A number that reads the same  
backwards and forwards

T.  $652 + 224$

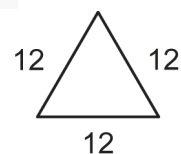
U. The hundred that 644 is closest to



## DOWN:

A.  $586 - 403$

B. The perimeter  
of the triangle



C. The number that means 5 tens

D. The number that means 15 tens

F.  $27 + \square = 50$

H. A number with two even digits

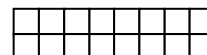
J. A number with two odd digits

M.  $878 + 10 + 10 + 10 + 10$

N.  $90 - 6$

Q. Choose the greatest number:  
890, 908, 809, 980

R. The number of  
unit squares in  
the array



S.  $2 \times 8$

## CROSS-NUMBER PUZZLE 5

<b>A</b>		<b>B</b>		<b>C</b>		<b>D</b>
		<b>E</b>	<b>F</b>			
<b>G</b>	<b>H</b>				<b>J</b>	
	<b>K</b>			<b>L</b>		
<b>M</b>			<b>N</b>		<b>P</b>	<b>Q</b>
		<b>R</b>		<b>S</b>		
<b>T</b>				<b>U</b>		

Cross-Number Discovery Puzzles 4 - © Celia Baron 2013

### ACROSS:

**A.** Write in standard form:  
 $900 + 30 + 7$

**C.**  $999 - 236$

**E.** A number between 500 and 600

**G.** An odd number

**J.** The next number in the pattern:  
 48, 52, 56, 60,

**K.**  $2 \times 9$

**L.** The number that means 2 groups of nine

**M.** A number with two odd digits

**P.**  $100 - 8$

**R.** A number whose digits add to 14

**T.** The number that means 10 tens

**U.** The number that means 16 tens

### DOWN:

**A.** The number that is 2 less than 950

**B.**  $48 + 27$

**C.** The number that means 6 tens and 15 ones

**D.** Choose the least number:  
 342, 423, 324, 432

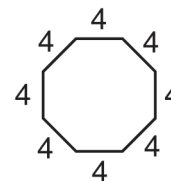
**F.**  $64 + \boxed{\phantom{00}} = 90$

**H.**  $675 + 10 + 10 + 10 + 10$

**J.** A number less than 700

**M.** The number of cents in 4 quarters, 4 dimes and 1 penny

**N.** The perimeter of the octagon



**Q.** The hundred that 154 is closest to



**R.**  $6 + 4 + 7 + 3 + 8 + 2$

**S.** The number of minutes in 1 hour and 31 minutes



SAMPLE.

# Assessment Sheets

Locating any gaps  
in math understanding

# OUTCOMES

## CROSS-NUMBER PUZZLE 5

QUESTION	NUMBER CONCEPT, STRATEGY AND SKILL	✓
<b>A</b> - across	3-digit numbers in canonical form	
<b>C</b> - across	Subtracting involving two 3-digit numbers without regrouping	
<b>J</b> - across	Recognizing patterns that increase by 4	
<b>K</b> - across	Basic multiplication facts – factors of 2	
<b>L</b> - across	Developing multiplication	
<b>P</b> - across	Subtracting from a decade	
<b>T</b> - across	3-digit numbers in non-canonical forms - hundreds and tens	
<b>U</b> - across	3-digit numbers in non-canonical forms - hundreds and tens	
<b>A</b> - down	Saying two numbers before a given 3-digit number	
<b>B</b> - down	Adding two 2-digit numbers with regrouping	
<b>C</b> - down	2-digit numbers in non-canonical forms	
<b>D</b> - down	Ordering 3-digit numerals	
<b>F</b> - down	Adding to a decade Missing addend tasks involving two 2-digit numbers	
<b>H</b> - down	Counting by 10s beyond 100, off the decade	
<b>M</b> - down	Determining the number of cents in pennies, dimes and 4 quarters	
<b>N</b> - down	Determining the perimeter	
<b>Q</b> - down	Determining the hundred a 3-digit number is closest to	
<b>R</b> - down	Combining pairs of numbers that add to 10, sum less than 40	
<b>S</b> - down	Determining the number of minutes in minutes and 1 hour	

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**COMMENTS:**



SAMPLE.

# Answer Keys

Providing immediate  
feedback to teachers

# CROSS-NUMBER PUZZLE 1

<sup>A</sup> 4	7	<sup>B</sup> 1		<sup>C</sup> 1	0	<sup>D</sup> 6
5		<sup>E</sup> 8	<sup>F</sup> 6	8		9
<sup>G</sup> 3	<sup>H</sup> 3		4		<sup>J</sup> 3	7
	<sup>K</sup> 5	2		<sup>L</sup> 5	2	
<sup>M</sup> 2	7		<sup>N</sup> 9		<sup>P</sup> 8	<sup>Q</sup> 6
9		<sup>R</sup> 3	0	<sup>S</sup> 1		0
<sup>T</sup> 1	4	0		<sup>U</sup> 1	4	0

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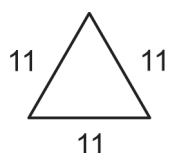
## ACROSS:

A. 796 - 325

C. The number of cents in 4 quarters and 6 pennies

E. A number that reads the same backwards and forwards

G. The perimeter of the triangle



J. An odd number

K.  $26 + 26$

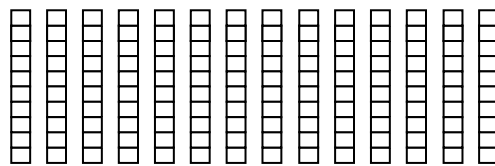
L. The number that means 4 tens and 12 ones

M. The next number in the pattern: 15, 18, 21, 24,

P. A number between 80 and 90

R. A number whose digits add to 4

T. The number shown by the blocks

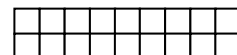


U. The number that means 14 tens

## DOWN:

A. Choose the least number: 543, 453, 553, 455

B. The number of unit squares in the array



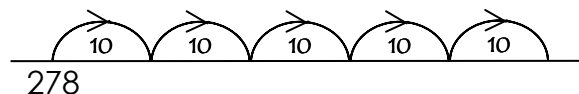
C.  $2 \times 9$

D.  $432 + 265$

F.  $70 - 6$

H. A number with three odd digits

J. The number reached on the last hop



M. Write in standard form:  $200 + 90 + 1$

N. The number of minutes in 1 hour and 30 minutes

Q. The hundred that 578 is closest to



R.  $7 + 3 + 4 + 6 + 1 + 9$

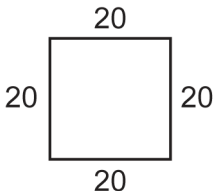
S.  $49 + \square = 60$

## CROSS-NUMBER PUZZLE 2

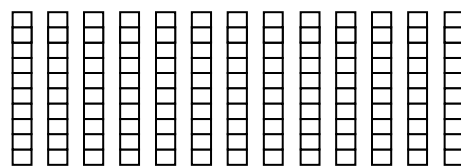
<b>A</b> 7	2	<b>B</b> 1		<b>C</b> 1	0	<b>D</b> 5
9		<b>E</b> 6	<b>F</b> 1	6		0
<b>G</b> 8	<b>H</b> 9		2		<b>J</b> 6	0
	<b>K</b> 8	0		<b>L</b> 7	4	
<b>M</b> 7	4		<b>N</b> 5		<b>P</b> 1	<b>Q</b> 8
5		<b>R</b> 3	2	<b>S</b> 7		7
<b>T</b> 1	3	0		<b>U</b> 1	3	0

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### ACROSS:

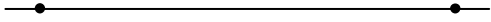
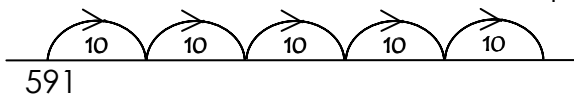
- A.** Write in standard form:  
700 + 20 + 1
- C.** The number of cents in 4 quarters and 1 nickel
- E.** A number with two digits the same
- G.** The number of minutes in 1 hour and 29 minutes
- J.** An even number
- K.** The perimeter of the square
- 
- L.** 37 + 37
- M.** The number that means 6 tens and 14 ones
- P.** A number less than 20
- R.** A number between 300 and 400

**T.** The number shown by the blocks



**U.** The number that means 13 groups of ten

### DOWN:

- A.** 425 + 373
- B.** The number that means 2 groups of eight
- C.** 2 x 8
- D.** The hundred that 543 is closest to
- 
- F.** 58 +  = 70
- H.** A number whose digits add to 21
- J.** The number reached on the last hop
- 
- M.** 986 - 235
- N.** The next number in the pattern:  
36, 40, 44, 48,
- Q.** Choose the greatest number:  
780, 807, 708, 870
- R.** 4 + 6 + 2 + 8 + 7 + 3
- S.** 80 - 9



# CROSS-NUMBER PUZZLE 3

<sup>A</sup> 1	9	<sup>B</sup> 8		<sup>C</sup> 8	7	<sup>D</sup> 3
2		<sup>E</sup> 6	<sup>F</sup> 3	6		2
<sup>G</sup> 5	<sup>H</sup> 3		9		<sup>J</sup> 7	4
	<sup>K</sup> 9	5		<sup>L</sup> 1	4	
<sup>M</sup> 1	4		<sup>N</sup> 2		<sup>P</sup> 1	<sup>Q</sup> 5
3		<sup>R</sup> 7	4	<sup>S</sup> 8		0
<sup>T</sup> 1	0	0		<sup>U</sup> 1	5	0

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## ACROSS:

A. The number that is 2 less than 200

C. Choose the greatest number:  
738, 837, 783, 873

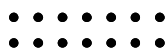
E. A number whose digits add to 15

G.  $60 - 7$

J. The next number in the pattern:  
82, 80, 78, 76,

K. The number of minutes in 1 hour  
and 35 minutes

L. The number of dots  
in the array



M.  $2 \times 7$

P.  $35 + \square = 50$

R.  $503 + 245$

T. The number that means 10 tens

U. The number that means 15 tens

## DOWN:

A. The number of cents in 4 quarters,  
2 dimes and 1 nickel

B.  $58 + 28$

C. The number that means 7 tens  
and 16 ones

D.  $284 + 10 + 10 + 10 + 10$

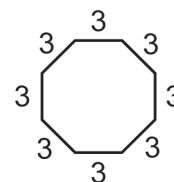
F.  $3 + 7 + 5 + 5 + 8 + 2 + 9$

H. A number between 300 and 400

J. A number with two odd digits

M.  $996 - 865$

N. The perimeter  
of the octagon



Q. The hundred that 468 is closest to



R. An even number

S. A number between 80 and 90

## CROSS-NUMBER PUZZLE 4

<sup>A</sup> 1	4	<sup>B</sup> 3		<sup>C</sup> 5	8	<sup>D</sup> 1
8		<sup>E</sup> 6	<sup>F</sup> 2	0		5
<sup>G</sup> 3	<sup>H</sup> 4		3		<sup>J</sup> 6	0
	<sup>K</sup> 5	3		<sup>L</sup> 5	3	
<sup>M</sup> 9	2		<sup>N</sup> 8		<sup>P</sup> 9	<sup>Q</sup> 9
1		<sup>R</sup> 1	4	<sup>S</sup> 1		8
<sup>T</sup> 8	7	6		<sup>U</sup> 6	0	0

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### ACROSS:

**A.** The number of cents in 4 quarters,  
4 dimes and 3 pennies

**C.** The number that is two more than 579

**E.** A number whose digits add to 8

**G.**  $8 + 2 + 3 + 7 + 1 + 9 + 4$

**J.** The next number in the pattern:  
48, 51, 54, 57,

**K.**  $28 + 25$

**L.** The number that means 4 tens  
and 13 ones

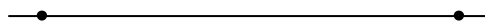
**M.** The number of minutes in 1 hour  
and 32 minutes

**P.** A number with both digits the same

**R.** A number that reads the same  
backwards and forwards

**T.**  $652 + 224$

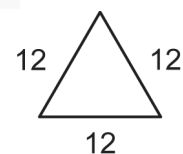
**U.** The hundred that 644 is closest to



### DOWN:

**A.**  $586 - 403$

**B.** The perimeter  
of the triangle



**C.** The number that means 5 tens

**D.** The number that means 15 tens

**F.**  $27 + \square = 50$

**H.** A number with two even digits

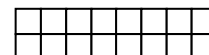
**J.** A number with two odd digits

**M.**  $878 + 10 + 10 + 10 + 10$

**N.**  $90 - 6$

**Q.** Choose the greatest number:  
890, 908, 809, 980

**R.** The number of  
unit squares in  
the array



**S.**  $2 \times 8$

## CROSS-NUMBER PUZZLE 5

<sup>A</sup> 9	3	<sup>B</sup> 7		<sup>C</sup> 7	6	<sup>D</sup> 3
4		<sup>E</sup> 5	<sup>F</sup> 2	5		2
<sup>G</sup> 8	<sup>H</sup> 7		6		<sup>J</sup> 6	4
	<sup>K</sup> 1	8		<sup>L</sup> 1	8	
<sup>M</sup> 1	5		<sup>N</sup> 3		<sup>P</sup> 9	<sup>Q</sup> 2
4		<sup>R</sup> 3	2	<sup>S</sup> 9		0
<sup>T</sup> 1	0	0		<sup>U</sup> 1	6	0

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### ACROSS:

**A.** Write in standard form:  
900 + 30 + 7

**C.** 999 - 236

**E.** A number between 500 and 600

**G.** An odd number

**J.** The next number in the pattern:  
48, 52, 56, 60,

**K.** 2 x 9

**L.** The number that means 2 groups of nine

**M.** A number with two odd digits

**P.** 100 - 8

**R.** A number whose digits add to 14

**T.** The number that means 10 tens

**U.** The number that means 16 tens

### DOWN:

**A.** The number that is 2 less than 950

**B.** 48 + 27

**C.** The number that means 6 tens and 15 ones

**D.** Choose the least number:  
342, 423, 324, 432

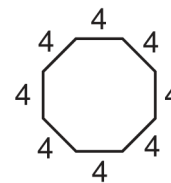
**F.** 64 +  = 90

**H.** 675 + 10 + 10 + 10 + 10

**J.** A number less than 700

**M.** The number of cents in 4 quarters, 4 dimes and 1 penny

**N.** The perimeter of the octagon



**Q.** The hundred that 154 is closest to



**R.** 6 + 4 + 7 + 3 + 8 + 2

**S.** The number of minutes in 1 hour and 31 minutes



SAMPLE.

# Games

A good and easy way  
to learn, and it's fun!

# CROSS-NUMBER DISCOVERY GAMES 4

*The order of Cross-Number Discovery Games follows the same order as that of Cross-Number Discovery Puzzles, with games 1-5 supporting the concepts introduced in puzzles 1-5. The games in each of the sections are repetitive and simple to learn. Detailed instructions for the games and an explanation of the outcomes they address are provided in the introductions to each of the sections. As the following games are most likely familiar to teachers, instructions for them are provided just once below.*

**Face-off** is a game for 2-4 players. All the cards are dealt to the players and each player places his/her cards face-down in a pile. Each player then turns over the top card of his/her pile and states the number shown on the card. The player with the greatest number is the winner of the round and takes the cards. Play continues in this manner until one player has won all the cards. If the game ends before that, the player with the greatest number of cards wins the game. Note: A variation of this game is to have players take turns before each round stating whether the greatest or least number will win that round.

**Fish** is a card game for 2-4 players. To start, 5 cards are dealt to each player and the remaining cards are placed face-down in a pile on a table. If a player has 2 matching cards, he/she sets these cards aside. After players have set aside their matches, they take turns asking the player to their left for a card that matches one in their hand. If the player to the left has the matching card, he/she must give it to the asking player who can then ask for another card. If the player to the left does not have a matching card, the player takes the top card from the pile on the table. The player with the greatest number of matches at the end of the game is the winner.

**Snap** is a card game for 2 players. The cards are placed face-down in 1 or 2 piles on a table depending on the nature of the game. The card(s) from the top of the pile(s) is(are) turned over. The first player to call out the answer takes the card(s). The player with the greater number of cards at the end of the game is the winner. Note: When choosing two players to play this game, make sure both understand the concepts involved or play will be too one-sided.

**Concentration** is a card game for 2-4 players. To begin, 20 cards (10 pairs) are placed face-down on a table in 4 rows and 5 columns. The first player turns over 2 cards. If they are a match, the player keeps the cards. If they are not a match, the player places the cards back face-down on the table and play goes to the next player. The player with the greatest number of cards at the end of the game is the winner.

There are a few score sheets that are required for a number of the games. They are included after this introduction.

## ADDING AND SUBTRACTING SCORE SHEET

QUESTION	WORK	WINNER

**LEAST SUM OR DIFFERENCE SCORE SHEET**

NUMERALS	NUMBER SENTENCE	WORK	WINNER

# CROSS-NUMBER GAMES 4: PUZZLES I-5

## I-5A.COUNTING BY 10s BEYOND 100

This face-off game consists of 20 cards showing ten-blocks. The game provides practice counting by 10s beyond 100.

This is a game for 2-4 players. The cards are placed face-down in a pile on a table. Depending on the number of the players, at least 2 sets of the 40 cards are required. Each player chooses 3 cards and states the total number of blocks on his/her cards. The player with the greatest number of blocks takes the cards. The player with the greatest number of cards at the end of the game wins.

## I-5B.ADDING 2-DIGIT NUMBERS WITH REGROUPING

This four-in-a row game consists of 16 cards and 4 game boards. Bingo chips are also required. Each card consists of two number sentences. The first number sentence involves adding **1-digit numbers** with sums greater or equal to 10 and helps with the second sentence that involves adding **2-digit numbers with regrouping**.

This is a game for 2-4 players. Players choose one of the 4 game boards. The cards are scattered face-down on the table. In turn each player chooses a card, and places bingo chips on the answers to the two number sentences that are available on his/her game board. If none of these missing addends is available on his/her game board, the player forfeits that turn. The first player with a complete row or column wins the game.

## I-5C.ADDING 2-DIGIT NUMBERS WITH REGROUPING

This face-off game consists of 14 cards. The game provides practice adding 2-digit numbers with regrouping. Blocks in groups of tens and ones can be provided for support. The score sheet for the adding and subtracting games included in the Introduction to Cross-Number Games 4 can be used for this game.

This is a game for 2 players. Each player is given a score sheet. The cards are scattered face-down on a table. In turn each player chooses a card, and can model the number sentence with blocks. The player can regroup 10 single blocks into 1 ten-block. The players record their work on their score sheet. The player with the greater answer wins the cards. The player with the greater number of wins after 7 rounds wins the game.

## I-5D.NUMBER BOUNCE

This is the first of 8 number bounce games. One is provided for each group of five puzzles. This number bounce game consists of 35 cards. It provides practice with tens and ones in both canonical and non-canonical form. For example, in canonical form, the number 25 would be 2 tens and 5 ones, while in non-canonical form it could be 1 ten and 15 ones.

Number bounces can be played by an entire class, small groups or individual students. When playing this game with an entire class, give each student one or two cards. Ask the student who has the card with the number 1 to begin. The student reads that he/she has the number 1 and asks for the next number on his/her card. The student who has the card with that number reads the card and asks for the next number. The game continues in this manner until all the cards are read. The last card will ask for number 1.



### **I-5E.ADDING TO A DECADE, MISSING ADDENDS LESS THAN 30**

This four-in-a row game consists of 16 cards and 4 game boards. Bingo chips are also required. Each card consists of two number sentences. The first number sentence involves finding a missing addend less than **10** and helps with the second sentence that involves finding a missing addend less than **30**.

This is a game for 2-4 players. Players choose one of the 4 game boards. The cards are scattered face-down on the table. In turn each player chooses a card, and places bingo chips on the missing addends of the two number sentences that are available on his/her game board. If none of these missing addends is available on hi/her game board, the player forfeits that turn. The first player with a complete row or column wins the game.

### **I-5F.ADDING AND SUBTRACTING**

This is the first of 8 adding and subtracting games. One is provided for each group of five puzzles. This face-off game consists of 14 cards and a score sheet. The game provides practice with the addition and subtraction questions in Puzzles 1-5. The score sheet for the adding and subtracting games is included in the Introduction to Cross-Number Games 4.

This is a game for 2 players. Each player is given a score sheet. The cards are scattered face-down on a table. Before each round, one player chooses whether the greater or lesser answer will win the round. Players choose a card, and complete the number sentence on their score sheet. The player with the greater or lesser answer wins the round. The player with the greater number of wins after 7 rounds wins the game.

### **I-5G.BASIC MUTLIPLICATION FACTS, FACTORS OF 2**

This is the first of 7 card games for the basic multiplication facts. One is provided for each group of 5 puzzles, with the exception of the last group of 5 puzzles. This game consists of 40 cards and represents multiplying by 2.

These cards can be used to play the games described in the Introduction to Cross-Number Games 4.

### **I-5H.ADDING TO 100**

This target-100 game consists of 47 cards of 5s, 10s, 25s, 50s and 100s. The game provides practice with adding coins.

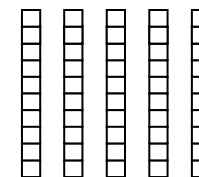
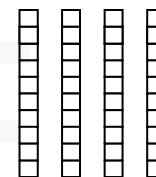
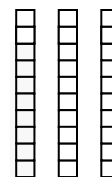
This is a game for 2-3 players. The cards are scattered face-down on the table. The players take turns choosing a card. When a player has cards that total 100, the player forms a set with these cards and puts this set aside. There are 2 cards showing 100 and each of these cards counts as one set. The player with the greatest number of sets of 100 at the end of the game wins.

# I-5A COUNTING BY 10s BEYOND 100

~ 20 CARDS ~

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SAMPLE



Book 4: 1-5A

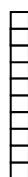
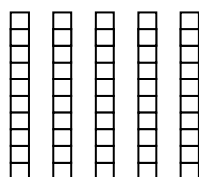
Book 4: 1-5A

Book 4: 1-5A

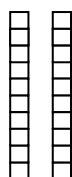
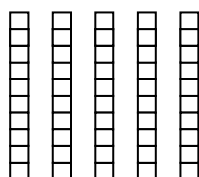
Book 4: 1-5A

Book 4: 1-5A

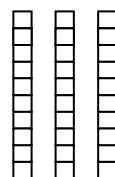
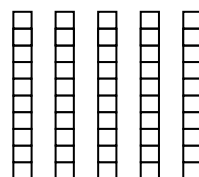
Book 4: 1-5A



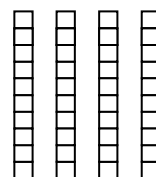
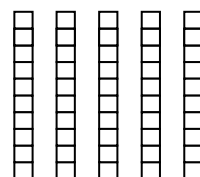
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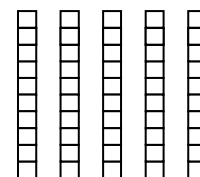
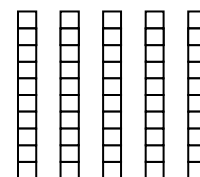
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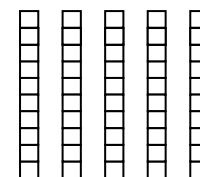
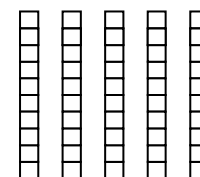
Book 4: 1-5A



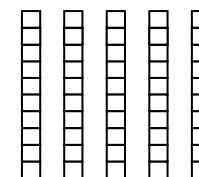
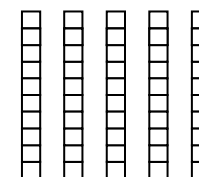
Book 4: 1-5A



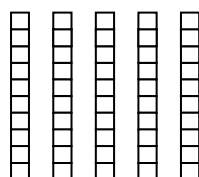
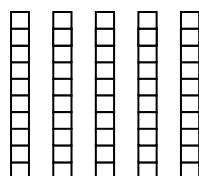
Book 4: 1-5A



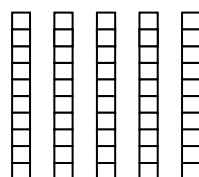
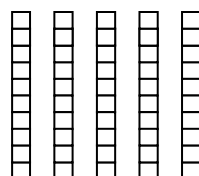
Book 4: 1-5A



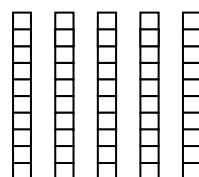
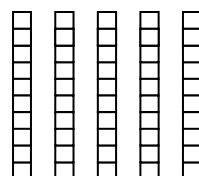
Book 4: 1-5A



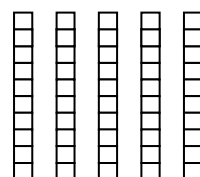
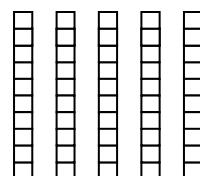
Book 4: 1-5A



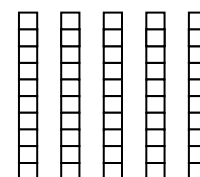
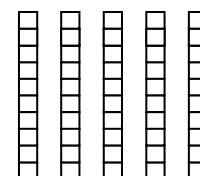
Book 4: 1-5A



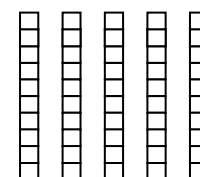
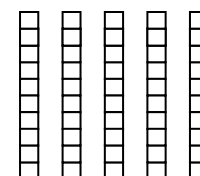
Book 4: 1-5A



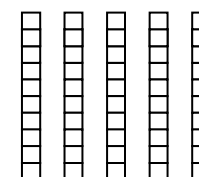
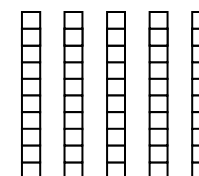
Book 4: 1-5A



Book 4: 1-5A



Book 4: 1-5A



Book 4: 1-5A

74	18	32	15
13	31	14	30
98	16	75	12
10	73	11	76

Book 4: 1-5B

14	52	11	75
78	13	30	16
10	76	15	53
51	18	54	12

Book 4: 1-5B

96	12	31	10
15	50	16	74
53	14	55	18
11	78	13	52

Book 4: 1-5B

50	11	54	18
14	32	15	96
98	16	73	12
13	55	10	51

Book 4: 1-5B

**I-5B**  
**ADDING 2-DIGIT NUMBERS**  
**WITH REGROUPING**  
**~ 16 CARDS ~**

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$\begin{array}{r} 5 + 5 \\ 15 + 15 \end{array}$ <p>Book 4: 1-5B</p>	$\begin{array}{r} 5 + 5 \\ 25 + 25 \end{array}$ <p>Book 4: 1-5B</p>
$\begin{array}{r} 5 + 6 \\ 15 + 16 \end{array}$ <p>Book 4: 1-5B</p>	$\begin{array}{r} 5 + 6 \\ 25 + 26 \end{array}$ <p>Book 4: 1-5B</p>
$\begin{array}{r} 6 + 6 \\ 16 + 16 \end{array}$ <p>Book 4: 1-5B</p>	$\begin{array}{r} 6 + 6 \\ 26 + 26 \end{array}$ <p>Book 4: 1-5B</p>
$\begin{array}{r} 6 + 7 \\ 26 + 27 \end{array}$ <p>Book 4: 1-5B</p>	$\begin{array}{r} 6 + 7 \\ 36 + 37 \end{array}$ <p>Book 4: 1-5B</p>
$\begin{array}{r} 7 + 7 \\ 27 + 27 \end{array}$ <p>Book 4: 1-5B</p>	$\begin{array}{r} 7 + 7 \\ 37 + 37 \end{array}$ <p>Book 4: 1-5B</p>
$\begin{array}{r} 7 + 8 \\ 27 + 28 \end{array}$ <p>Book 4: 1-5B</p>	$\begin{array}{r} 7 + 8 \\ 37 + 38 \end{array}$ <p>Book 4: 1-5B</p>
$\begin{array}{r} 8 + 8 \\ 38 + 38 \end{array}$ <p>Book 4: 1-5B</p>	$\begin{array}{r} 8 + 8 \\ 48 + 48 \end{array}$ <p>Book 4: 1-5B</p>
$\begin{array}{r} 9 + 9 \\ 39 + 39 \end{array}$ <p>Book 4: 1-5B</p>	$\begin{array}{r} 9 + 9 \\ 49 + 49 \end{array}$ <p>Book 4: 1-5B</p>

**1-5C**  
**ADDING 2-DIGIT NUMBERS**  
**WITH REGROUPING**  
**~ 14 CARDS ~**

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$$17 + 14$$

Book 4: 1-5C

$$16 + 16$$

Book 4: 1-5C

$$18 + 15$$

Book 4: 1-5C

$$19 + 16$$

Book 4: 1-5C

$$24 + 16$$

Book 4: 1-5C

$$25 + 17$$

Book 4: 1-5C

$$26 + 18$$

Book 4: 1-5C

$$25 + 25$$

Book 4: 1-5C

$$26 + 26$$

Book 4: 1-5C

$$27 + 27$$

Book 4: 1-5C

$$28 + 28$$

Book 4: 1-5C

$$37 + 26$$

Book 4: 1-5C

$$38 + 27$$

Book 4: 1-5C

$$39 + 28$$

Book 4: 1-5C

**I-5D**  
**NUMBER  
BOUNCE**

~ 35 CARDS ~

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I have

**1**

Who has

**6** tens?

Book 4: 1-5D

I have

**60**

Who has

**7** tens and **3** ones?

Book 4: 1-5D

I have

**73**

Who has

**7** tens and **13** ones?

Book 4: 1-5D

I have

**83**

Who has

**7** tens and **23** ones?

Book 4: 1-5D

I have

**93**

Who has

**4** tens and **4** ones?

Book 4: 1-5D

I have

**44**

Who has

**1** ten and **8** ones?

Book 4: 1-5D

I have

**18**

Who has

**2** tens and **15** ones?

Book 4: 1-5D

I have

**35**

Who has

**2** tens and **25** ones?

Book 4: 1-5D

I have

**45**

Who has

**9** ones?

Book 4: 1-5D

I have

**9**

Who has

**9** tens?

Book 4: 1-5D

I have

**90**

Who has

**5** tens and **1** one?

Book 4: 1-5D

I have

**51**

Who has  
**5** tens and **11** ones?

Book 4: 1-5D

I have

**61**

Who has  
**3** tens and **9** ones?

Book 4: 1-5D

I have

**39**

Who has  
**20** ones?

Book 4: 1-5D

I have

**20**

Who has  
**23** ones?

Book 4: 1-5D

I have

**23**

Who has  
**6** ones?

Book 4: 1-5D

I have

**6**

Who has  
**7** tens and **9** ones?

Book 4: 1-5D

I have

**79**

Who has  
**7** tens and **10** ones?

Book 4: 1-5D

I have

**80**

Who has  
**16** ones?

Book 4: 1-5D

I have

**16**

Who has  
**9** tens and **9** ones?

Book 4: 1-5D

I have

**99**

Who has  
**10** tens?

Book 4: 1-5D

I have

**100**

Who has  
**7** tens and **7** ones?

Book 4: 1-5D

I have

**77**

Who has  
**2** tens and **22** ones?

Book 4: 1-5D

I have

**42**

Who has  
**1** ten and **15** ones?

Book 4: 1-5D

I have

**25**

Who has  
**5** tens and **17** ones?

Book 4: 1-5D

I have

**67**

Who has  
**24** ones?

Book 4: 1-5D

I have

**24**

Who has  
**3** tens and **10** ones?

Book 4: 1-5D

I have

**40**

Who has  
**3** tens and **20** ones?

Book 4: 1-5D

I have

**50**

Who has  
**2** ones?

Book 4: 1-5D

I have

**2**

Who has  
**6** tens and **27** ones?

Book 4: 1-5D

I have

**87**

Who has  
**7** tens?

Book 4: 1-5D

I have

**70**

Who has  
**1** ten and **12** ones?

Book 4: 1-5D

I have

**22**

Who has  
**6** tens and **5** ones?

Book 4: 1-5D

I have

**65**

Who has  
**26** ones?

Book 4: 1-5D

I have

**26**

Who has  
**1** one?

Book 4: 1-5D



3	12	7	9
27	8	24	15
5	16	2	23
28	4	19	6

Book 4: 1-5E

2	29	8	16
14	5	27	3
7	23	4	15
18	6	22	9

Book 4: 1-5E

7	29	26	4
25	2	8	13
9	17	14	6
28	3	5	12

Book 4: 1-5E

9	22	13	8
17	6	5	24
3	18	19	2
25	4	7	26

Book 4: 1-5E

**I-5E**  
**ADDING TO A DECADE,**  
**MISSING ADDENDS LESS THAN 30**  
**~ 16 CARDS ~**

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$5 + \square = 10$ $5 + \square = 20$ <small>Book 4: 1-5E</small>	$5 + \square = 10$ $5 + \square = 30$ <small>Book4: 1-5E</small>
$8 + \square = 10$ $18 + \square = 30$ <small>Book 4: 1-5E</small>	$8 + \square = 10$ $18 + \square = 40$ <small>Book 4: 1-5E</small>
$1 + \square = 10$ $21 + \square = 40$ <small>Book 4: 1-5E</small>	$1 + \square = 10$ $21 + \square = 50$ <small>Book 4: 1-5E</small>
$6 + \square = 10$ $36 + \square = 50$ <small>Book 4: 1-5E</small>	$6 + \square = 10$ $36 + \square = 60$ <small>Book 4: 1-5E</small>
$2 + \square = 10$ $42 + \square = 60$ <small>Book 4: 1-5E</small>	$2 + \square = 10$ $42 + \square = 70$ <small>Book 4: 1-5E</small>
$7 + \square = 10$ $57 + \square = 70$ <small>Book 4: 1-5E</small>	$7 + \square = 10$ $57 + \square = 80$ <small>Book 4: 1-5E</small>
$4 + \square = 10$ $64 + \square = 80$ <small>Book 4: 1-5E</small>	$4 + \square = 10$ $64 + \square = 90$ <small>Book 4: 1-5E</small>
$3 + \square = 10$ $73 + \square = 90$ <small>Book 4: 1-5E</small>	$3 + \square = 10$ $73 + \square = 100$ <small>Book 4: 1-5E</small>

**I-5F**  
**ADDING AND SUBTRACTING**

**~ 14 CARDS ~**

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$$34 + 34$$

Book 4: 1-5F

$$35 + 35$$

Book 4: 1-5F

$$36 + 36$$

Book 4: 1-5F

$$48 + 29$$

Book 4: 1-5F

$$634 + 123$$

Book 4: 1-5F

$$444 + 333$$

Book 4: 1-5F

$$970 + 10 + 10 + 10$$

Book 4: 1-5F

$$586 + 10 + 10 + 10$$

Book 4: 1-5F

$$699 + 10 + 10 + 10$$

Book 4: 1-5F

$$70 - 8$$

Book 4: 1-5F

$$80 - 6$$

Book 4: 1-5F

$$80 - 7$$

Book 4: 1-5F

$$757 - 123$$

Book 4: 1-5F

$$989 - 345$$

Book 4: 1-5F

**1-5G  
BASIC  
MULTIPLICATION  
FACTS, FACTORS  
OF 2**

**~ 40 CARDS ~**

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:

Book 4: 1-5G

| + |

Book 4: 1-5G

2 x |

Book 4: 1-5G

2

Book 4: 1-5G

::

Book 4: 1-5G

2 + 2

Book 4: 1-5G

2 x 2

Book 4: 1-5G

4

Book 4: 1-5G

:::

Book 4: 1-5G

3 + 3

Book 4: 1-5G

2 x 3

Book 4: 1-5G

6

Book 4: 1-5G

:::

Book 4: 1-5G

4 + 4

Book 4: 1-5G

2 x 4

Book 4: 1-5G

8

Book 4: 1-5G

:::

Book 4: 1-5G

5 + 5

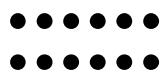
Book 4: 1-5G

2 x 5

Book 4: 1-5G

10

Book 4: 1-5G



Book 4: 1-5G

$$6 + 6$$

Book 4: 1-5G

$$2 \times 6$$

Book 4: 1-5G

$$12$$

Book 4: 1-5G



Book 4: 1-5G

$$7 + 7$$

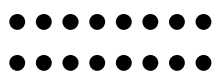
Book 4: 1-5G

$$2 \times 7$$

Book 4: 1-5G

$$14$$

Book 4: 1-5G



Book 4: 1-5G

$$8 + 8$$

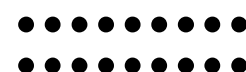
Book 4: 1-5G

$$2 \times 8$$

Book 4: 1-5G

$$16$$

Book 4: 1-5G



Book 4: 1-5G

$$9 + 9$$

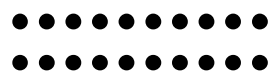
Book 4: 1-5G

$$2 \times 9$$

Book 4: 1-5G

$$18$$

Book 4: 1-5G



Book 4: 1-5G

$$10 + 10$$

Book 4: 1-5G

$$2 \times 10$$

Book 4: 1-5G

$$20$$

Book 4: 1-5G

**1-5H  
ADDING TO  
100**

**~ 47 CARDS ~**

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Book 4: 1-5H



Book 4: 1-5H



Book 4: 1-5H



Book 4: 1-5H



Book 4: 1-5H



Book 4: 1-5H



Book 4: 1-5H



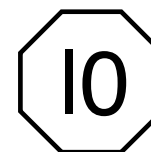
Book 4: 1-5H



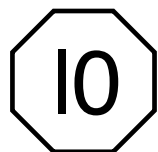
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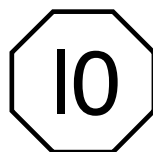
Book 4: 1-5H



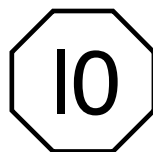
Book 4: 1-5H



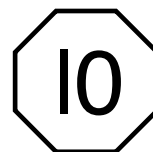
Book 4: 1-5H



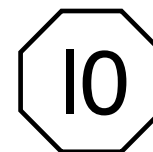
Book 4: 1-5H



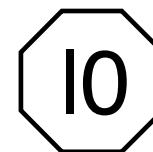
Book 4: 1-5H



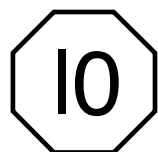
Book 4: 1-5H



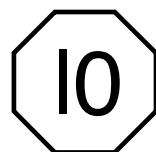
Book 4: 1-5H



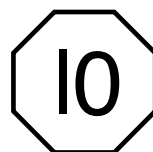
Book 4: 1-5H



Book 4: 1-5H



Book 4: 1-5H



Book 4: 1-5H

























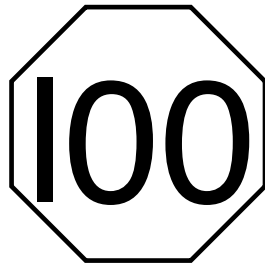
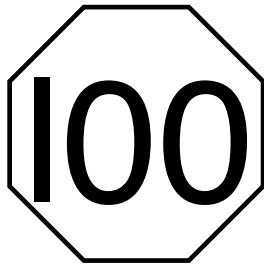
Book 4: 1-5H



Book 4: 1-5H



Book 4: 1-5H

 Book 4: 1-5H	 Book 4: 1-5H	 Book 4: 1-5H	 Book 4: 1-5H	 Book 4: 1-5H	 Book 4: 1-5H
 Book 4: 1-5H	 Book 4: 1-5H	 Book 4: 1-5H	 Book 4: 1-5H	 Book 4: 1-5H	 Book 4: 1-5H
 Book 4: 1-5H	 Book 4: 1-5H	 Book 4: 1-5H	 Book 4: 1-5H	 Book 4: 1-5H	 Book 4: 1-5H
 Book 4: 1-5H	 Book 4: 1-5H	 Book 4: 1-5H	 Book 4: 1-5H	 Book 4: 1-5H	 Book 4: 1-5H