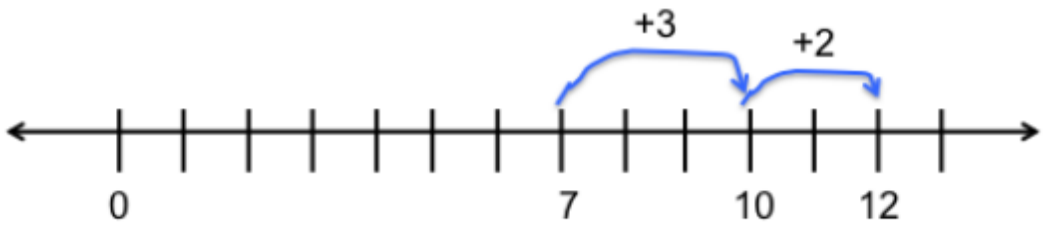
Module 1 Appendix

TAB

PAGE

Jake has some animal books. He has 7 car books. Altogether he has 12 books. How many of the books are animal books?

Student Work (number line was already drawn):



___ + 7 = 12

You can turn this around and write:

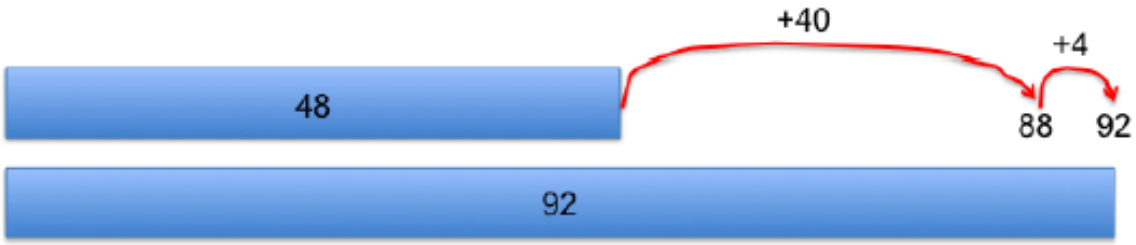
7 + ___ = 12

Start at 7 and count up 5 more:

7 + 5 = 12

Mary has 48 rings and John has 92 rings. How many more rings does John have than Mary?

Student Work (this problem has a second part below):



92 = 48 + <u>44</u>

John has 44 more rings than Mary.

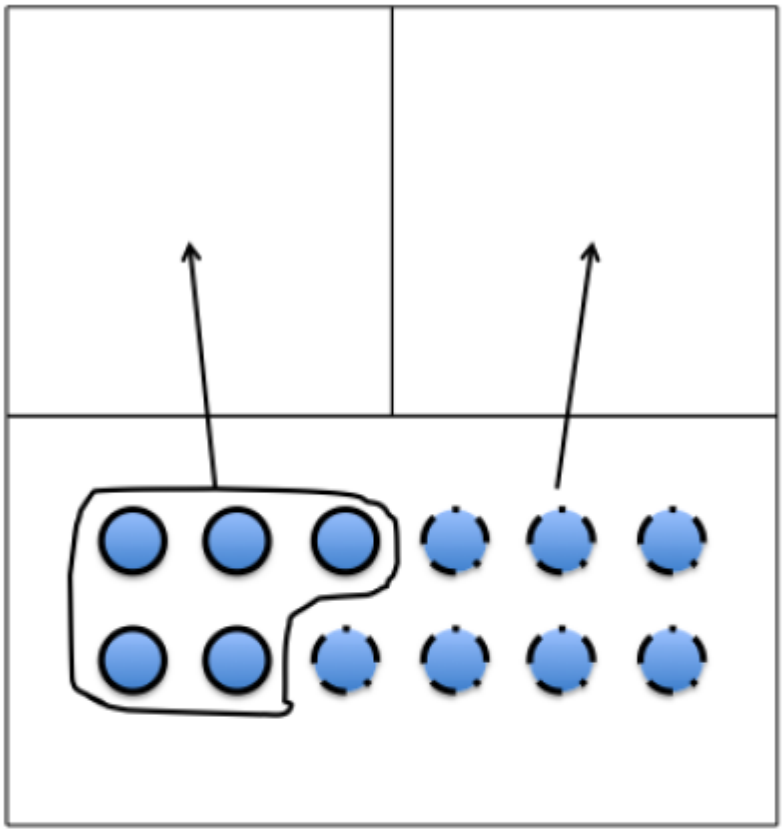
How many more does Mary need to equal John's amount of rings?

48 + <u>40</u> + <u>4</u> = 92

48 + <u>44</u> = 92

Sam has 12 pieces of candy. He eats 5 pieces. How many pieces of candy does he have left?

Student Work:

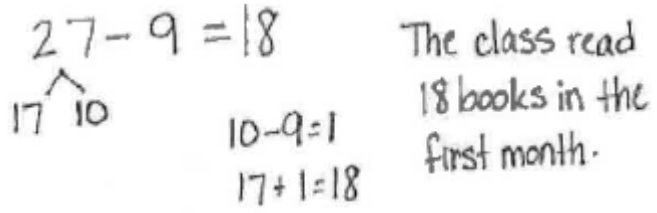


12 – 5 = ___

12 – 5 = 7

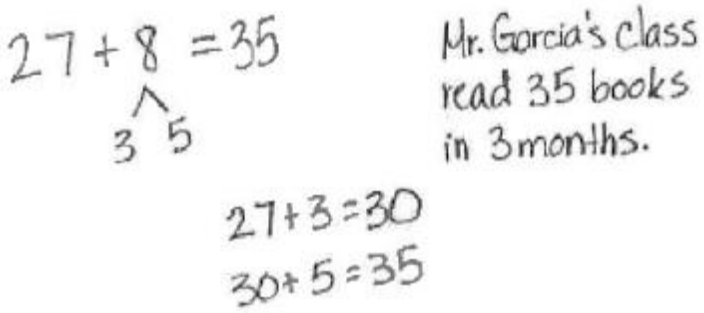
4. Mr. Garcia checked out 27 library books for his class. The class read some the first month and the remaining 9 books the second month.
   a. Use words, pictures, or numbers to find out how many books the class read in the first month.

Student work:



b. During the third month, Mr. Garcia checked out 8 more books and his class read them all. Use words, pictures, or numbers to show how many library books Mr. Garcia's class read in all 3 months.

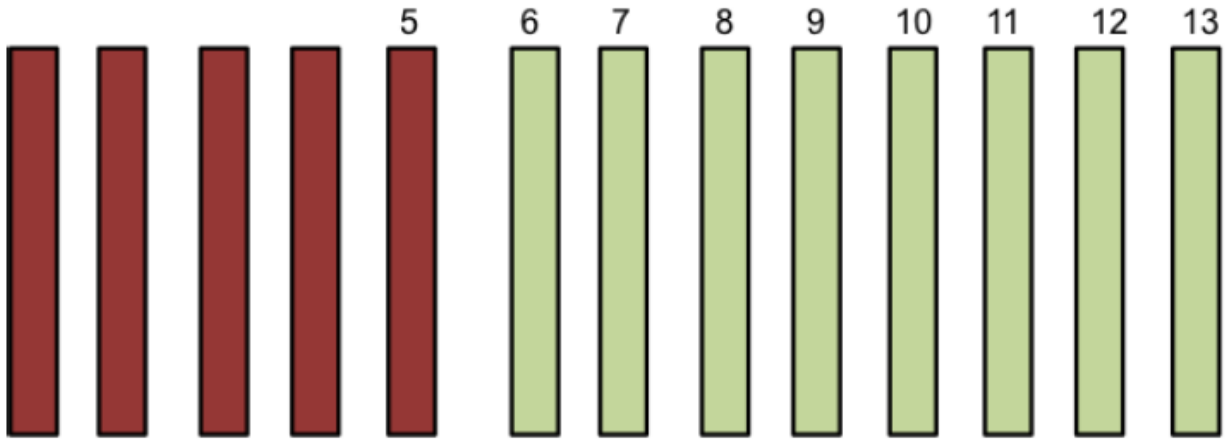
Student Work:



(Retrieved from engageny.org)

Joe has 5 red pencils and 8 green pencils in the case. How many pencils does he have in the case?

Student Work:

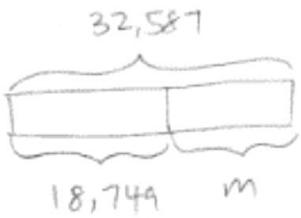


5 + 8 = ____

8 + 5 = 13 or 5 + 8 = 13

Draw a tape diagram to represent each problem. Use numbers to solve, and write your answer as a statement.

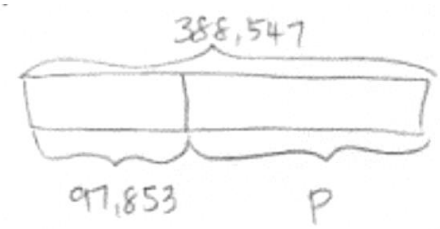
1. Sean's school raised $32,587. Leslie's school raised $18,749. How much more money did Sean's school raise?



$$\begin{array}{r} 32,587 \\ -\ 18,749 \\ \hline 13,838 \end{array}$$

Sean's school raised $13,838 more money than Leslie's school.

2. At a parade, 97,853 people sat in bleachers, and 388,547 people stood along the street. How many fewer people were in the bleachers than standing on the street?



$$\begin{array}{r} 388,547 \\ -\ 97,853 \\ \hline 290,694 \end{array}$$

There were 290,694 fewer people in the bleachers.

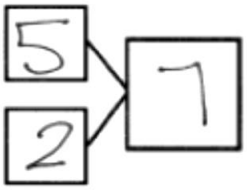
(Retrieved from engageny.org)

1.

5 + 2 = 7

5 balls are here. 2 more roll over. Now, there are 7 balls.

Make a number bond to match the story.

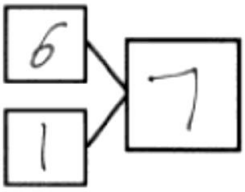


2.

6 1 = 7

6 frogs are here. 1 more hops over. Now, there are 7 frogs.

Make a number bond to match the story.



(Retrieved from engageny.org)

5. Martha answered the problem 400 – 378 incorrectly. She does not understand her mistake.

a. Explain to Martha what she did wrong using place value language.

Explanation:

Martha changed 1 hundred for 10 tens and 10 ones. It should have been changed for 9 tens and 10 ones.

b. Model an alternate strategy for 400 – 378 to help Martha avoid making this mistake again.

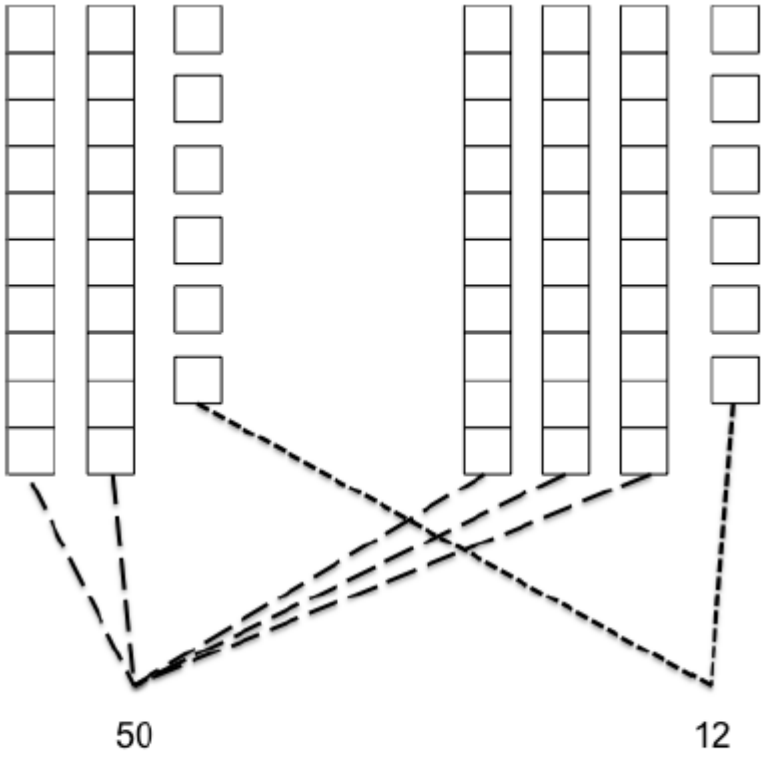
Martha can take 1 from each number, then subtract.

$$\begin{array}{r} 399 \\ -377 \\ \hline 22 \end{array}$$

(Retrieved from engageny.org)

Mary has 26 cookies. She gets 36 more cookies. How many cookies does she have altogether?

Student Work:



26 + 36 = ___

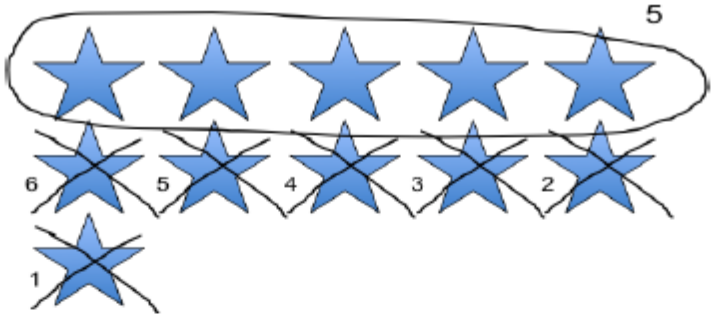
20 + 30 = 50 *and* 6 + 6 = 12

50 + 12 = ___

60 + 2 = 62

Tabitha has 11 star stickers. She puts some of the star stickers on her paper. She has 5 star stickers left. How many did she put on her paper?

Student Work:

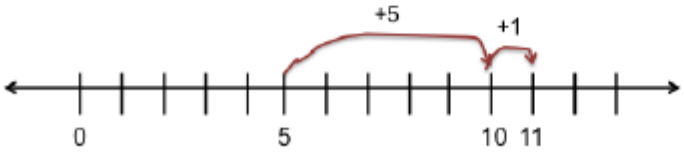


11 – ____ = 5

Turn around and write 11 – 5 = ___

11 – 5 = 6 so 11 – 6 = 5

Can you show a second way of solving this problem?

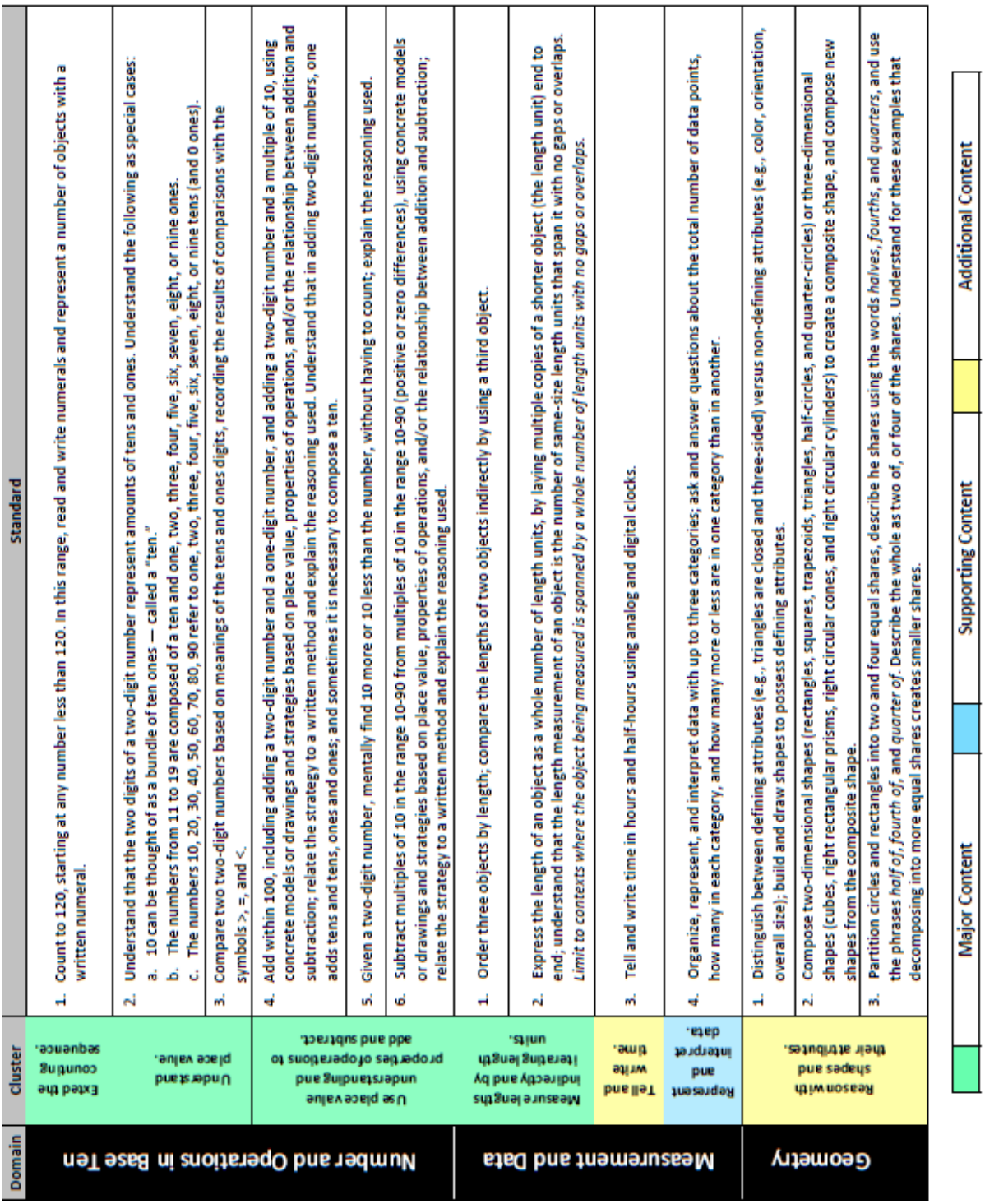


5 + ___ = 11, so 5 + 6 = 11 or 11 – 6 = 5

2016 Tennessee Math Content Standards, Grade 1

Domain	Cluster	Standard
Operations and Algebraic Thinking	Represent and solve problems involving addition and subtraction.	1. Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.
		2. Solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.
	Understand and apply properties of operations and the relationship between addition and subtraction.	3. Apply properties of operations as strategies to add and subtract. *Examples: If 8 + 3 = 11 is known, then 3 + 8 = 11 is also known. (Commutative property of addition.) To add 2 + 6 + 4, the second two numbers can be added to make a ten, so 2 + 6 + 4 = 2 + 10 = 12. (Associative property of addition.)* (Students need not use formal terms for these properties.)
		4. Understand subtraction as an unknown-addend problem. *For example, subtract 10 – 8 by finding the number that makes 10 when added to 8.*
	Add and subtract within 20.	5. Relate counting to addition and subtraction (e.g., by counting on 2 to add 2).
		6. Add and subtract within 20, demonstrating fluency for addition and subtraction within 10. Use strategies such as counting on; making ten (e.g., 8 + 6 = 8 + 2 + 4 = 10 + 4 = 14); decomposing a number leading to a ten (e.g., 13 – 4 = 13 – 3 – 1 = 10 – 1 = 9); using the relationship between addition and subtraction (e.g., knowing that 8 + 4 = 12, one knows 12 – 8 = 4); and creating equivalent but easier or known sums (e.g., adding 6 + 7 by creating the known equivalent 6 + 6 + 1 = 12 + 1 = 13).
	Work with addition and	7. Understand the meaning of the equal sign, and determine if equations involving addition and subtraction are true or false. *For example, which of the following equations are true and which are false? 6 = 6, 7 = 8 – 1, 5 + 2 = 2 + 5, 4 + 1 = 5 + 2.*
		8. Determine the unknown whole number in an addition or subtraction equation relating three whole numbers. *For example, determine the unknown number that makes the equation true in each of the equations 8 + ? = 11, 5 = □ – 3, 6 + 6 = □.*

2016 Tennessee Math Content Standards, Grade 1



Domain	Cluster	Standard
Number and Operations in Base Ten	Extend the counting sequence.	1. Count to 120, starting at any number less than 120. In this range, read and write numerals and represent a number of objects with a written numeral.
	Understand place value.	2. Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases: a. 10 can be thought of as a bundle of ten ones — called a "ten." b. The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones. c. The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).
		3. Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols >, =, and <.
	Use place value understanding and properties of operations to add and subtract.	4. Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten.
		5. Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used.
		6. Subtract multiples of 10 in the range 10-90 from multiples of 10 in the range 10-90 (positive or zero differences), using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.
Measurement and Data	Measure lengths indirectly and by iterating length units.	1. Order three objects by length; compare the lengths of two objects indirectly by using a third object.
		2. Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. *Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps.*
	Tell and write time.	3. Tell and write time in hours and half-hours using analog and digital clocks.
Measurement and Data	Represent and interpret data.	4. Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.
Geometry	Reason with shapes and their attributes.	1. Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, overall size); build and draw shapes to possess defining attributes.
		2. Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) or three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape, and compose new shapes from the composite shape.
		3. Partition circles and rectangles into two and four equal shares, describe he shares using the words *halves*, *fourths*, and *quarters*, and use the phrases *half of*, *fourth of*, and *quarter of*. Describe the whole as two of, or four of the shares. Understand for these examples that decomposing into more equal shares creates smaller shares.

Major Content | Supporting Content | Additional Content

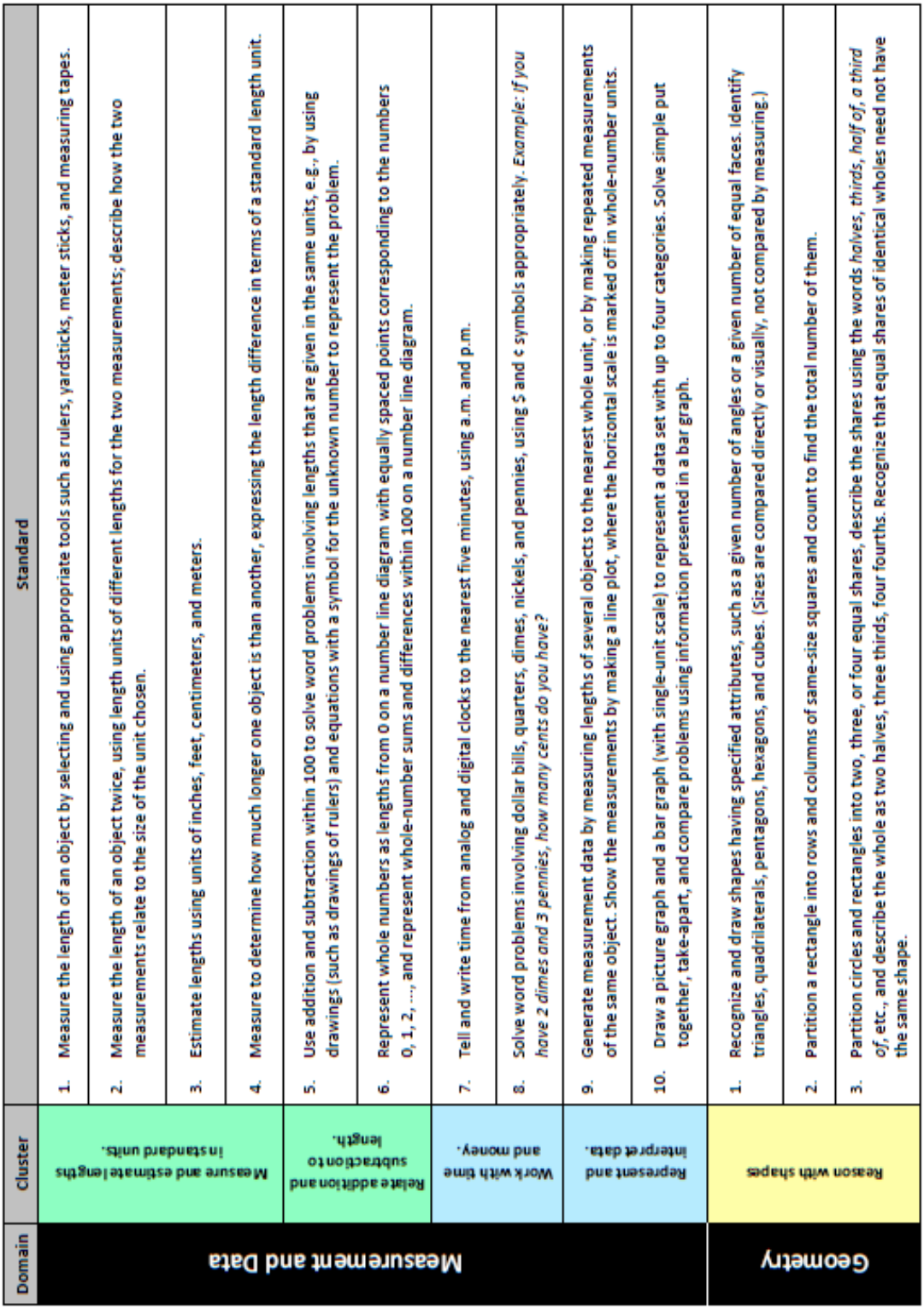
TN Department of Education

2016 Tennessee Math Content Standards, Grade 2

Domain	Cluster	Standard
Operations and Algebraic Thinking	Represent and solve problems involving addition and subtraction.	1. Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.
	Add and subtract within 20.	2. Fluently add and subtract within 20 using mental strategies.2 By end of Grade 2, know from memory all sums of two one-digit numbers.
	Work with equal groups of objects to gain foundations for multiplication.	3. Determine whether a group of objects (up to 20) has an odd or even number of members, e.g., by pairing objects or counting them by 2s; write an equation to express an even number as a sum of two equal addends.
		4. Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends.
Number and Operations in Base Ten	Understand place value.	1. Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones; e.g., 706 equals 7 hundreds, 0 tens, and 6 ones. Understand the following as special cases: a. 100 can be thought of as a bundle of ten tens — called a "hundred." b. The numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds (and 0 tens and 0 ones).
		2. Count within 1000; skip-count by 5s, 10s, and 100s.
		3. Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.
		4. Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using >, =, and < symbols to record the results of comparisons.
	Use place value understanding and properties of operations to add and subtract.	5. Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.
		6. Add up to four two-digit numbers using strategies based on place value and properties of operations.
		7. Add and subtract within 1000, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method. Understand that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds.
		8. Mentally add 10 or 100 to a given number 100–900, and mentally subtract 10 or 100 from a given number 100–900.
		9. Explain why addition and subtraction strategies work, using place value and the properties of operations. (Explanations may be supported by drawings or objects.)

TN Department of Education

2016 Tennessee Math Content Standards, Grade 2



TN Department of Education

2016 Tennessee Math Content Standards, Grade 3

Domain	Cluster	Standard
Operations and Algebraic Thinking	Represent and solve problems involving multiplication and division.	1. Interpret products of whole numbers, e.g., interpret 5 × 7 as the total number of objects in 5 groups of 7 objects each. *For example, describe a context in which a total number of objects can be expressed as 5 × 7.*
		2. Interpret whole-number quotients of whole numbers, e.g., interpret 56 ÷ 8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. *For example, describe a context in which a number of shares or a number of groups can be expressed as 56 ÷ 8.*
		3. Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.1
		4. Determine the unknown whole number in a multiplication or division equation relating three whole numbers. *For example, determine the unknown number that makes the equation true in each of the equations 8 × ? = 48, 5 = □ ÷ 3, 6 × 6 = ?.*
	Understand properties of multiplication and the relationship between multiplication and division.	5. Apply properties of operations as strategies to multiply and divide.2 *Examples: If 6 × 4 = 24 is known, then 4 × 6 = 24 is also known. (Commutative property of multiplication.) 3 × 5 × 2 can be found by 3× 5 = 15, then 15 × 2 = 30, or by 5 × 2 = 10, then 3 × 10 = 30. (Associative property of multiplication.) Knowing that 8 × 5 = 40 and 8 × 2 = 16, one can find 8 × 7 as 8 × (5 + 2) = (8 × 5) + (8 × 2) = 40 + 16 = 56. (Distributive property.)* (Students need not use formal terms for these properties.)
		6. Understand division as an unknown-factor problem. *For example, find 32 ÷ 8 by finding the number that makes 32 when multiplied by 8.*
	Multiply and divide within 100.	7. Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8 × 5 = 40, one knows 40 ÷ 5 = 8) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.
	Solve problems involving the four operations, and identify and explain patterns in arithmetic.	8. Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. (This standard is limited to problems posed with whole numbers and having whole number answers; students should know how to perform operations in the conventional order when there are no parentheses to specify a particular order (Order of Operations).)
		9. Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. *For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends.*

TN Department of Education

2016 Tennessee Math Content Standards, Grade 3

Domain	Cluster	Standard
Number and Operations in Base Ten	Use place value understanding and properties of operations to perform multi-digit arithmetic. (A range of algorithms may be used.)	1. Use place value understanding to round whole numbers to the nearest 10 or 100.
		2. Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.
		3. Multiply one-digit whole numbers by multiples of 10 in the range 10–90 (e.g., 9×80, 5×60) using strategies based on place value and properties of operations.
Number and Operations—Fractions*	Develop understanding of fractions as numbers.	1. Understand a fraction $1/b$ as the quantity formed by 1 part when a whole is partitioned into b equal parts; understand a fraction a/b as the quantity formed by a parts of size $1/b$.
		2. Understand a fraction as a number on the number line; represent fractions on a number line diagram. a. Represent a fraction $1/b$ on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into b equal parts. Recognize that each part has size $1/b$ and that the endpoint of the part based at 0 locates the number $1/b$ on the number line. b. Represent a fraction a/b on a number line diagram by marking off a lengths $1/b$ from 0. Recognize that the resulting interval has size a/b and that its endpoint locates the number a/b on the number line.
		3. Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size. a. Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line. b. Recognize and generate simple equivalent fractions, e.g., $1/2 = 2/4$, $4/6 = 2/3$). Explain why the fractions are equivalent, e.g., by using a visual fraction model. c. Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. *Examples: Express 3 in the form 3 = 3/1; recognize that 6/1 = 6; locate 4/4 and 1 at the same point of a number line diagram.* d. Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.

*Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.

2016 Tennessee Math Content Standards, Grade 3

Domain	Cluster	Standard
Measurement and Data	Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.	1. Tell and write time to the nearest minute and measure time intervals in minutes. Solve word problems involving addition and subtraction of time intervals in minutes, e.g., by representing the problem on a number line diagram.
		2. Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l).6 Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem.
	Represent and interpret data.	3. Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs. *For example, draw a bar graph in which each square in the bar graph might represent 5 pets.*
		4. Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units— whole numbers, halves, or quarters.
	Geometric measurement: understand concepts of area and relate area to multiplication and to addition.	5. Recognize area as an attribute of plane figures and understand concepts of area measurement. a. A square with side length 1 unit, called "a unit square," is said to have "one square unit" of area, and can be used to measure area. b. A plane figure which can be covered without gaps or overlaps by *n* unit squares is said to have an area of *n* square units.
		6. Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units).
		7. Relate area to the operations of multiplication and addition. a. Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths. b. Multiply side lengths to find areas of rectangles with whole number side lengths in the context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning. c. Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths a and $b + c$ is the sum of $a \times b$ and $a \times c$. Use area models to represent the distributive property in mathematical reasoning. d. Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems.
	Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.	8. Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.
Geometry	Reason with Shapes and their attributes.	1. Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories.
		2. Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. *For example, partition a shape into 4 parts with equal area, and describe the area of each part as 1/4 of the area of the shape.*

Major Content | Supporting Content | Additional Content

TN Department of Education

2016 Speaking and Listening Standards, Grade 1

Standard	
Comprehension and Collaboration	1. Participate in collaborative conversations with diverse partners about *grade 1 topics and texts* with peers and adults in small and larger groups. a. Follow agreed-upon rules for discussions (e.g., listening to others with care, speaking one at a time about the topics and texts under discussion). b. Build on others' talk in conversations by responding to the comments of others through multiple exchanges. c. Ask questions to clear up any confusion about the topics and texts under discussion. 2. Ask and answer questions about key details in a text read aloud or information presented orally or through other media. 3. Ask and answer questions about what a speaker says in order to gather additional information or clarify something that is not understood.
Presentation of Knowledge and Ideas	4. Describe people, places, things, and events with relevant details, expressing ideas and feelings clearly. 5. Add drawings or other visual displays to descriptions when appropriate to clarify ideas, thoughts, and feelings. 6. Produce complete sentences when appropriate to task and situation. (See grade 1 Language standards 1 and 3 on page 16 for specific expectations.)

TN Department of Education

2016 Speaking and Listening Standards, Grade 2

	Standard
Comprehension and Collaboration	1. Participate in collaborative conversations with diverse partners about *grade 2 topics and texts* with peers and adults in small and larger groups. a. Follow agreed-upon rules for discussions (e.g., gaining the floor in respectful ways, listening to others with care, speaking one at a time about the topics and texts under discussion). b. Build on others' talk in conversations by linking their comments to the remarks of others. c. Ask for clarification and further explanation as needed about the topics and texts under discussion. 2. Recount or describe key ideas or details from a text read aloud or information presented orally or through other media. 3. Ask and answer questions about what a speaker says in order to clarify comprehension, gather additional information or deepen understanding of a topic or issue.
Presentation of Knowledge and Ideas	4. Tell a story or recount an experience with appropriate facts and relevant, descriptive details, speaking audibly in coherent sentences. 5. Create audio recordings of stories or poems; add drawings or other visual displays to stories or recounts of experiences when appropriate to clarify ideas, thoughts, and feelings. 6. Produce complete sentences when appropriate to task and situation in order to provide requested detail or clarification. (See grade 2 Language standards 1 and 3 on page 26 for specific expectations.)

TN Department of Education

institute for learning

TNCore

Accountable Talk® Features and Indicators

Accountability to the Learning Community

- Active participation in classroom talk
- Listen attentively
- Elaborate and build on each other's ideas
- Work to clarify or expand a proposition

Accountability to Knowledge

- Specific and accurate knowledge
- Appropriate evidence for claims and arguments
- Commitment to getting it right

Accountability to Rigorous Thinking

- Synthesize several sources of information
- Construct explanations and test understanding of concepts
- Formulate conjectures and hypotheses
- Employ generally accepted standards of reasoning
- Challenge the quality of evidence and reasoning

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institute for learning

TNCore

Accountable Talk® Moves

Talk Move	Function	Example
To Ensure Purposeful, Coherent, and Productive Group Discussion		
Marking	Direct attention to the value and importance of a student's contribution.	That's an important point.
Challenging	Redirect a question back to the students or use students' contributions as a source for further challenge or query.	Let me challenge you: Is that always true?
Revoicing	Align a student's explanation with content or connect two or more contributions with the goal of advancing the discussion of the content.	S: 4 + 4 + 4. You said three groups of four.
Recapping	Make public in a concise, coherent form, the group's achievement at creating a shared understanding of the phenomenon under discussion.	Let me put these ideas all together. What have we discovered?

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Accountable Talk® Moves

Talk Move	Function	Example
	To Ensure Purposeful, Coherent, and Productive Group Discussion	
Marking	Direct attention to the value and importance of a student's contribution.	It is important to say describe to compare the size of the pieces and then to look at how many pieces of that size.
Challenging	Redirect a question back to the students or use students' contributions as a source for further challenge or query.	Let me challenge you: Is that always true?
Revoicing	Align a student's explanation with content or connect two or more contributions with the goal of advancing the discussion of the content.	You said 3, yes there are three columns and each column is 1/3 of the whole
Recapping	Make public in a concise, coherent form, the group's achievement at creating a shared understanding of the phenomenon under discussion.	Let me put these ideas all together. What have we discovered?
	To Support Accountability to Community	
Keeping the Channels Open	Ensure that students can hear each other, and remind them that they must hear what others have said.	Say that again and louder. Can someone repeat what was just said?
Keeping Everyone Together	Ensure that everyone not only heard, but also understood, what a speaker said.	Can someone add on to what was said? Did everyone hear that?
Linking Contributions	Make explicit the relationship between a new contribution and what has gone before.	Does anyone have a similar idea? Do you agree or disagree with what was said? Your idea sounds similar to his idea.
Verifying and Clarifying	Revoice a student's contribution, thereby helping both speakers and listeners to engage more profitably in the conversation.	So are you saying..? Can you say more? Who understood what was said?
	To Support Accountability to Knowledge	
Pressing for Accuracy	Hold students accountable for the accuracy, credibility, and clarity of their contributions.	Why does that happen? Someone give me the term for that.
Building on Prior Knowledge	Tie a current contribution back to knowledge accumulated by the class at a previous time.	What have we learned in the past that links with this?
	To Support Accountability to Rigorous Thinking	
Pressing for Reasoning	Elicit evidence to establish what contribution a student's utterance is intended to make within the group's larger enterprise.	Say why this works. What does this mean? Who can make a claim and then tell us what their claim means?
Expanding Reasoning	Open up extra time and space in the conversation for student reasoning.	Does the idea work if I change the context? Use bigger numbers?

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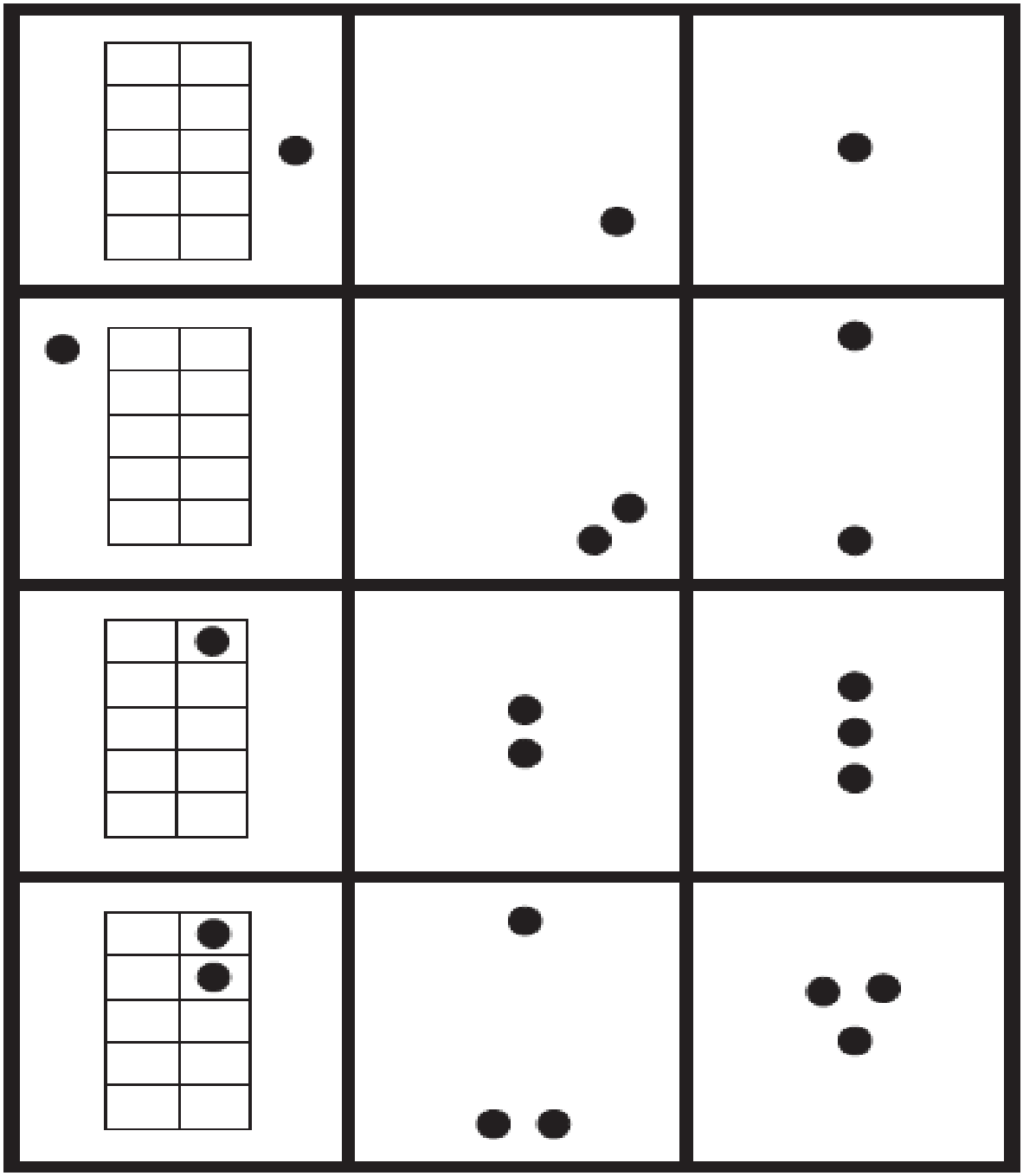
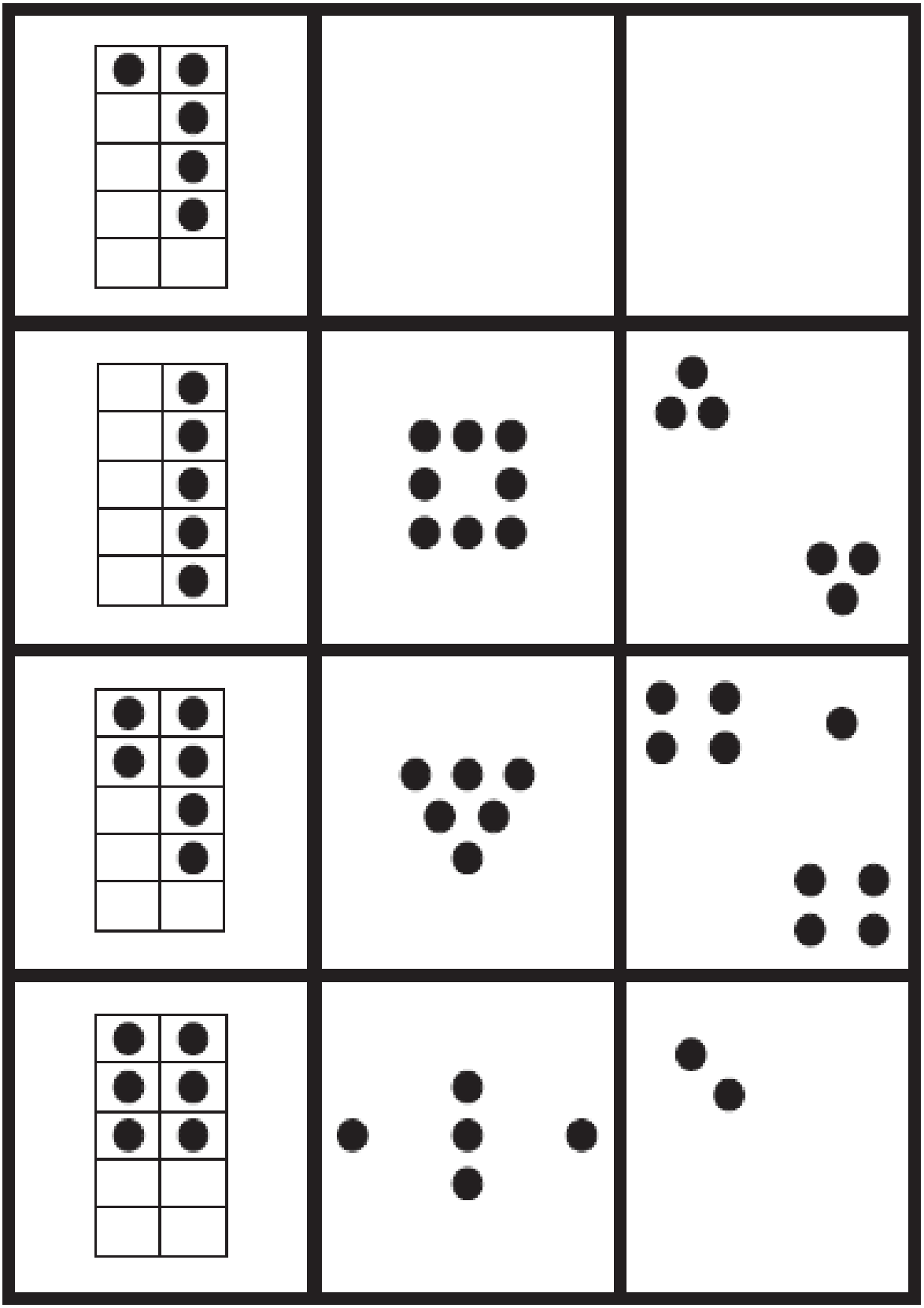
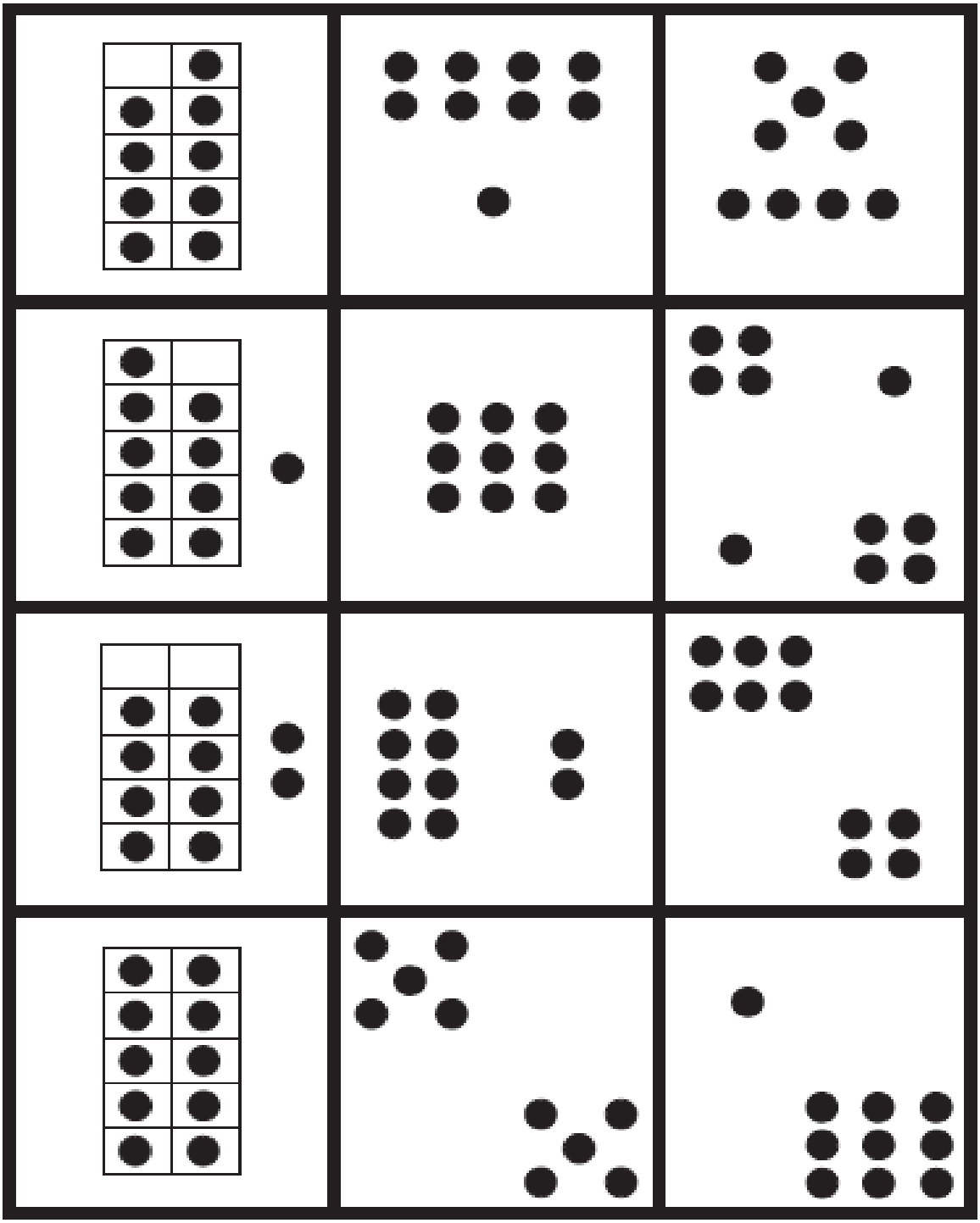
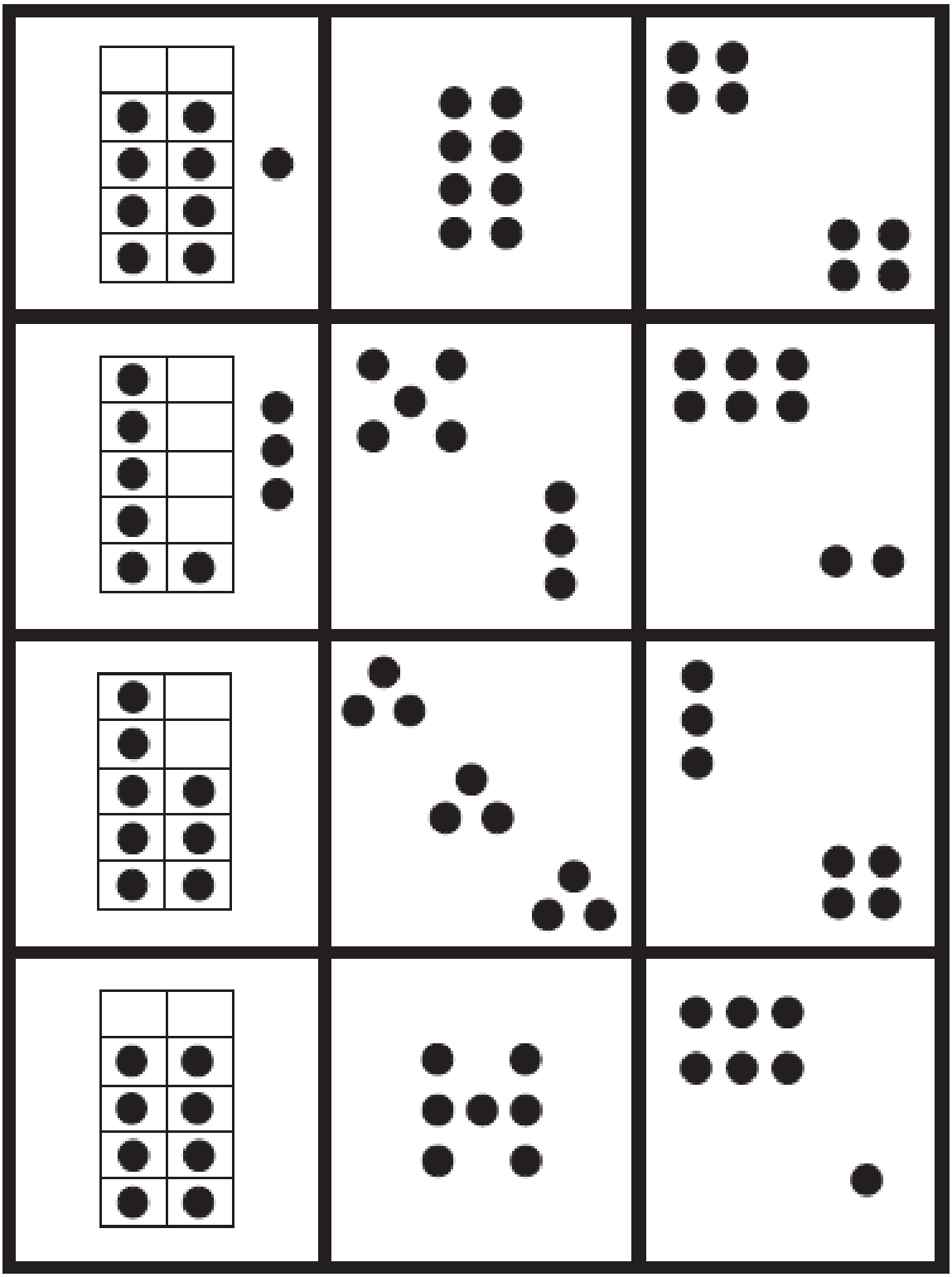
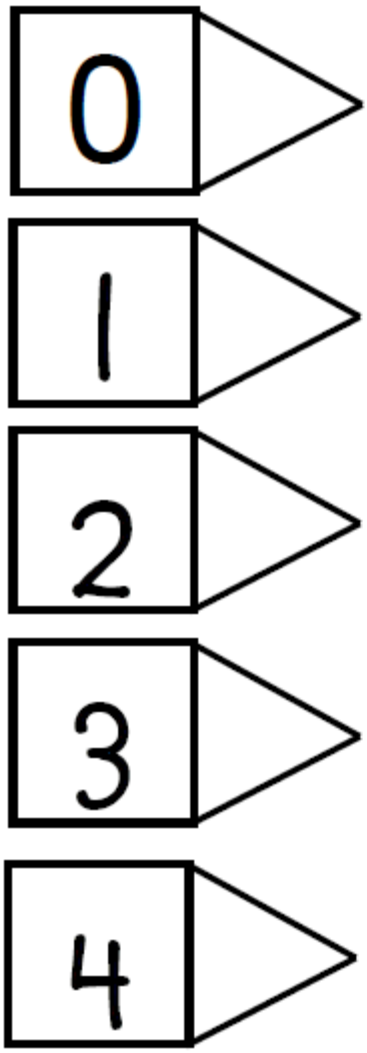
Module 2 Appendix







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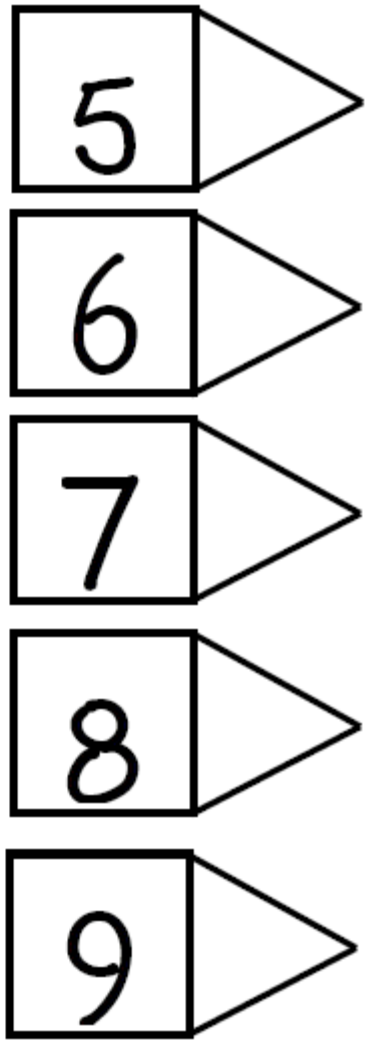
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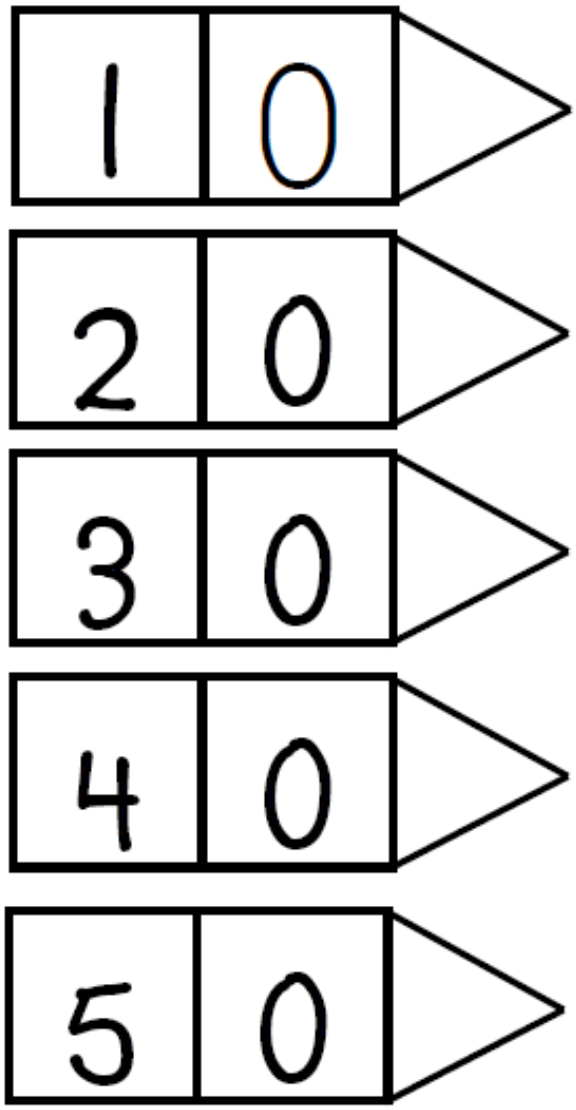
9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40
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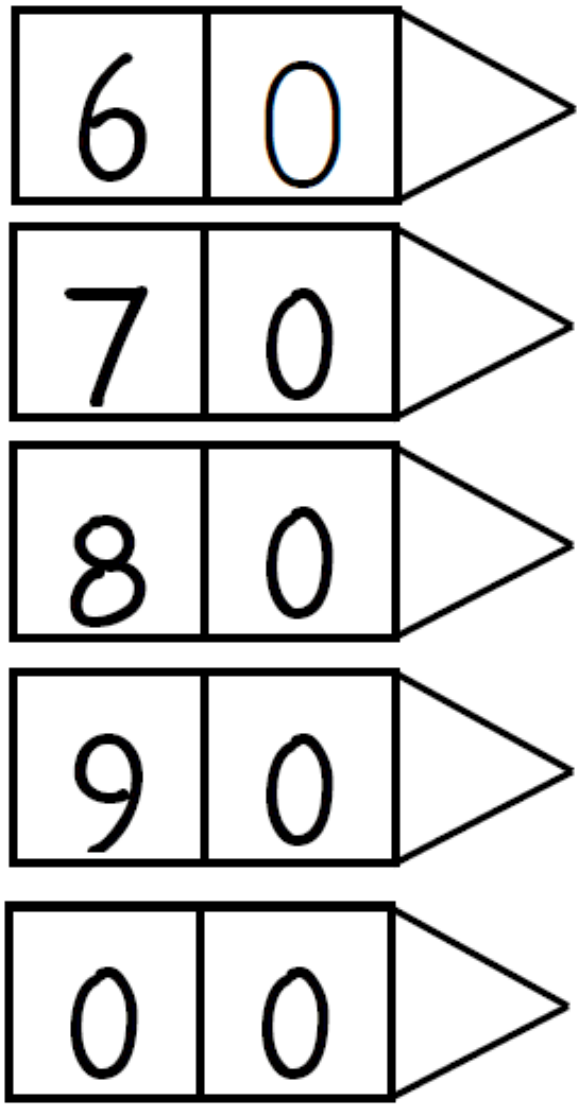
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7 0
8 0
9 0
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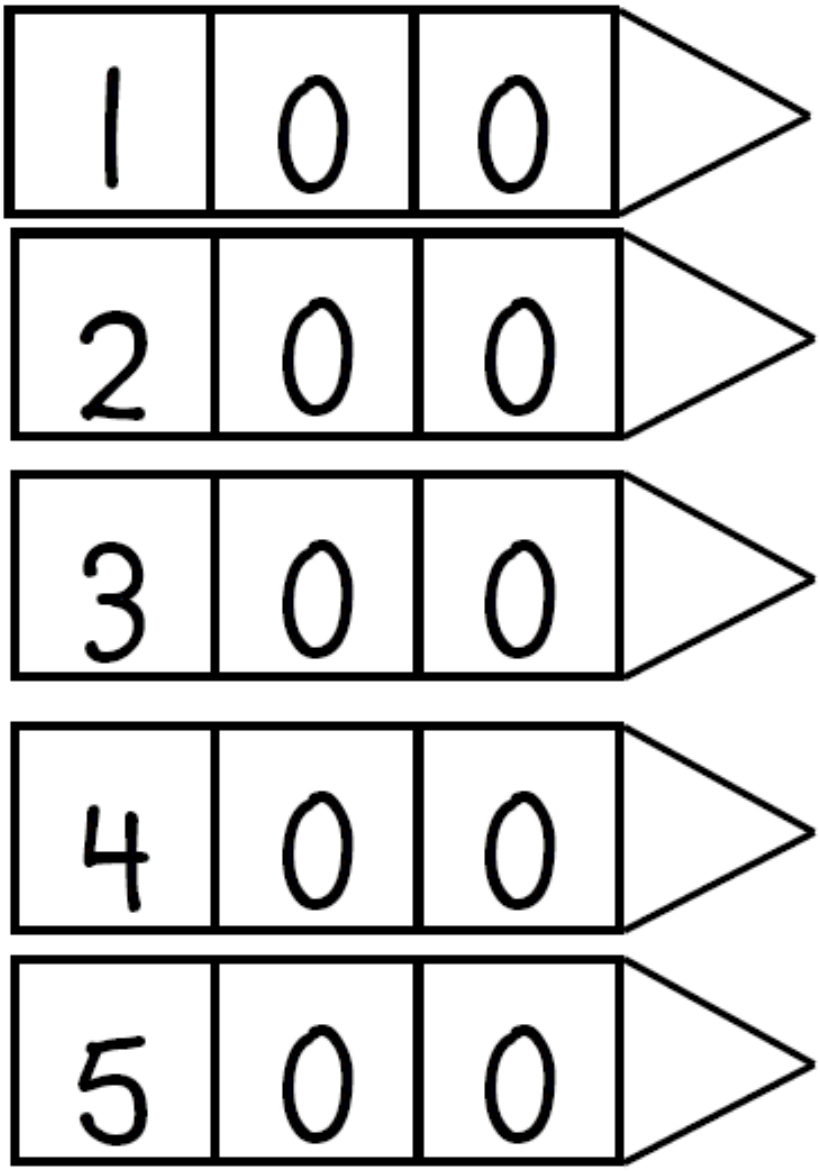
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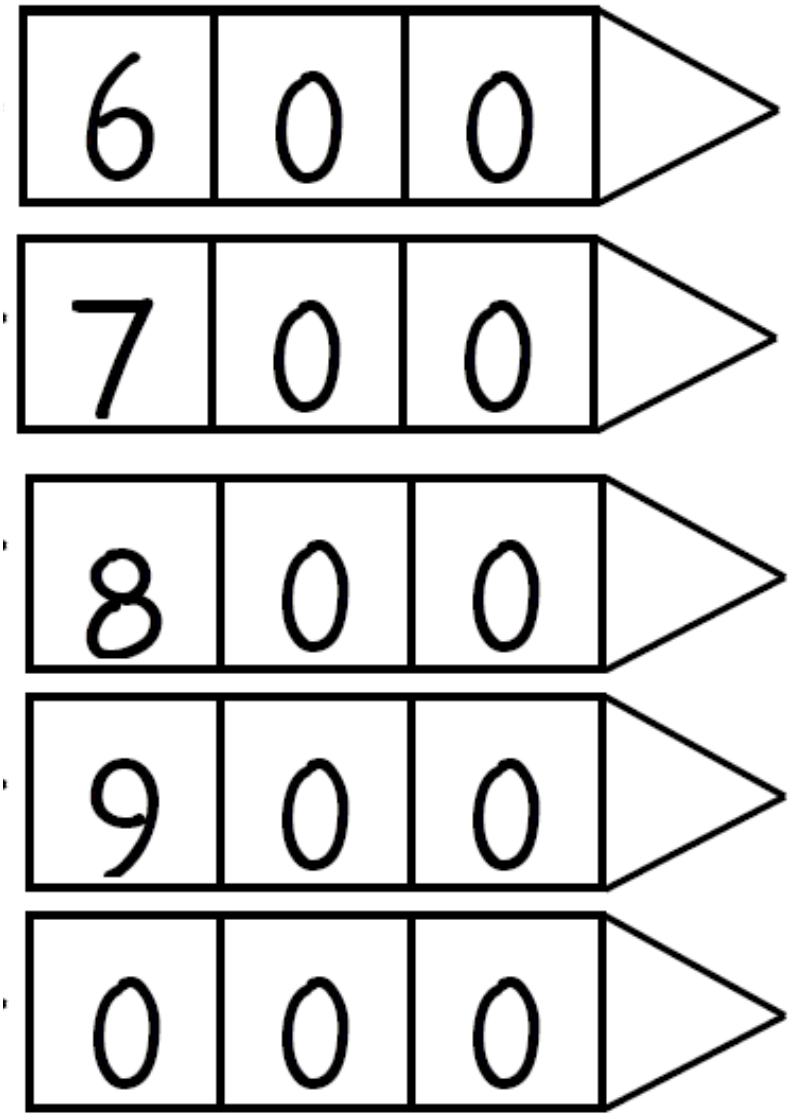
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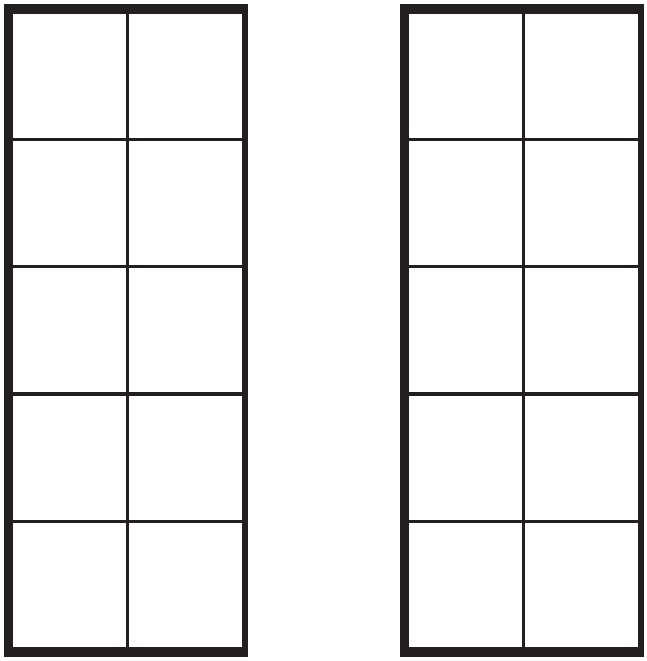

TENS

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Number Talks

- Number talks are classroom conversations and discussions around purposefully-crafted computation problems. They are opportunities for students to share mathematical thinking.
- Number talks are designed to elicit specific strategies that focus on number relationships and number theory.
- Computational Goals: Accuracy, Flexibility, and Efficiency.

Number Talks are...	Number Talks are not...
A concentrated period of 5 to 15 minutes --3 to 5 times per week --whole group or small group	An entire math lesson
Purposefully-crafted computation problems that students are expected to solve mentally with accuracy, efficiency, and flexibility	Unrelated and disjointed problems --calendar time --number of the day
Rooted in classroom discussions --errors are used as opportunities to unearth misconceptions	Pre-teaching strategies

- Parrish, 2014.

Number Talk Tips

- During pre-planning of number talks, anticipate possible strategies that might arise with specific problems.
- If you aren't able to follow a student's strategy, it's okay to tell them you want time to think about their strategy more deeply.
- Make sure your notation is mathematically correct as you record student thinking.
- Let students start with partner talk until they get used to sharing whole group.
- Have students complete an exit problem requiring them to solve the problem two ways and to place an asterisk by the most efficient strategy.

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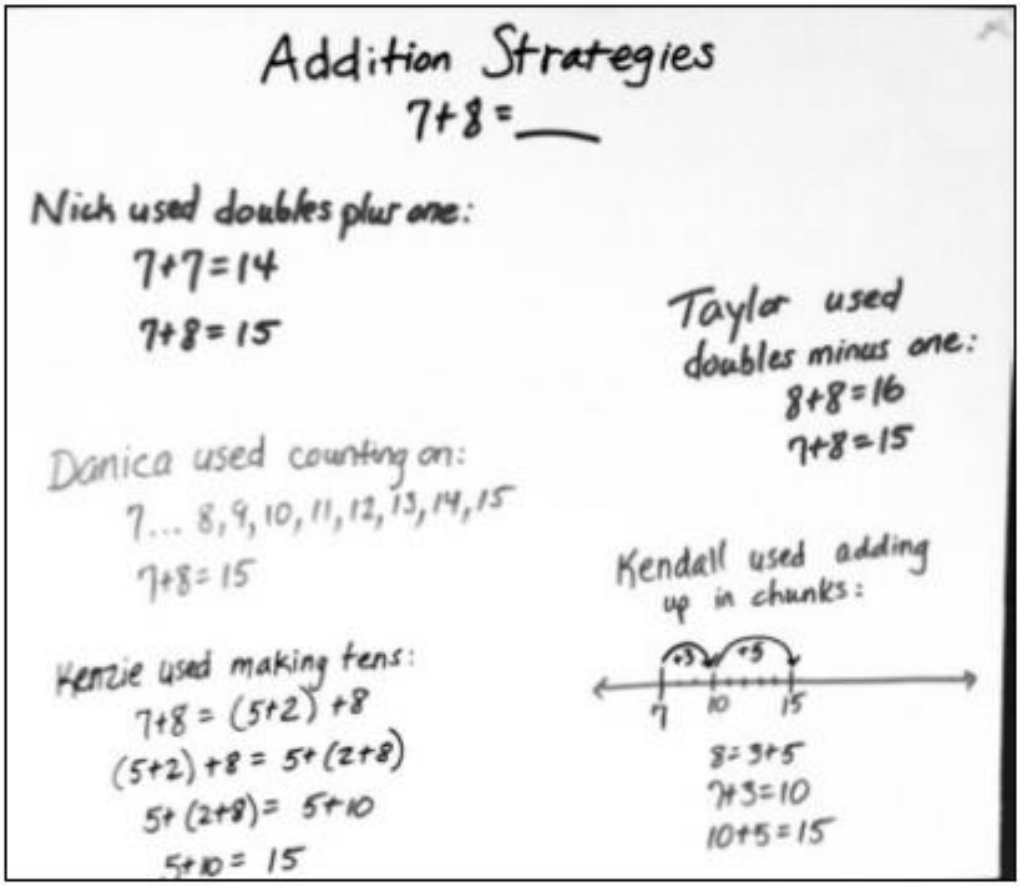
Teacher's Role in Number Talks

Your Goal:
Provide a clear path for students to see where every number in suggested solutions comes from.

How?
Purposeful Recording.

Ask Questions:
Push and question to get to what students are thinking.

Create and Post Class Strategy Charts:
Similar to anchor charts in reading, class strategy charts provide a reference for students as they work.



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First Grade Number Talks

The number talk examples are designed to provide first graders with opportunities to continue to develop fluency with numbers up to ten.

Each grouping is designed to be accomplished in a single session of 5-15 minutes. The sequence of problems allows students to apply strategies from previous problems to subsequent problems. Although students may solve the computation problems with multiple reasoning strategies, the "number talks" are grouped according to the strategy that is intended to be fostered.

Addition: Counting All/Counting On

3 + 6
3 + 7
3 + 8

9 + 1
9 + 3
9 + 5
9 + 7

Addition: Doubles/Near Doubles

4 + 4
4 + 3
3 + 3
3 + 4

8 + 8
8 + 9
9 + 9
9 + 10

15 + 15
15 + 16
14 + 14
14 + 15

Addition: Make Ten

5 + 5
5 + 5 + 4
5 + 3 + 5

1 + 8 + 9
9 + 3 + 1
1 + 6 + 9

Addition: Making Landmark or Friendly Numbers

8 + 2
8 + 2 + 4
8 + 6
8 + 5

20 + 5
19 + 1 + 4
19 + 5
19 + 8

Parrish, S. (2014). *Number Talks: Helping Children Build Mental Math and Computation Strategies.* Sausalito: Math Solutions.

Second Grade Number Talks

The number talk examples are designed to provide second graders with opportunities to continue to develop fluency with numbers using addition and subtraction reasoning strategies.

Each grouping is designed to be accomplished in a single session of 5-15 minutes. The sequence of problems allows students to apply strategies from previous problems to subsequent problems. Although students may solve the computation problems with multiple reasoning strategies, the "number talks" are grouped according to the strategy that is intended to be fostered.

There are three categories of number talks under each reasoning strategy. Category 1 represents introductory number talks designed to foster the use of a specific strategy. Category 2 number talks are to be used with students who are successfully using the specified strategy. Category 3 number talks allow students to have opportunities to extend their use of the targeted strategy.

Addition: Doubles/Near Doubles

Category 1:	Category 2:	Category 3:
6 + 6	11 + 11	25 + 25
6 + 5	12 + 12	24 + 25
6 + 7	11 + 12	25 + 26
	11 + 10	24 + 26

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Addition: Make Ten

Category 1:	Category 2:	Category 3:
2 + 5 + 8	4 + 6 + 8 + 2	8 + 2
4 + 7 + 6	9 + 3 + 1 + 7	8 + 5
5 + 5 + 8	5 + 6 + 5 + 4	8 + 4
		8 + 7

Addition: Making Landmark or Friendly Numbers

Category 1:	Category 2:	Category 3:
20 + 5	30 + 5	30 + 50
19 + 5	28 + 2 + 3	29 + 49
19 + 7	28 + 5	28 + 48
19 + 8	28 + 7	29 + 48
	28 + 16	

Addition: Breaking Each Number into Its Place Value

Category 1:	Category 2:	Category 3:
20 + 20	13 + 18	38 + 58
23 + 25	16 + 15	67 + 17
24 + 21	17 + 14	44 + 38
22 + 26	12 + 19	25 + 66

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Addition: Compensation

Category 1:	Category 2:	Category 3:
14 + 9	7 + 19	17 + 23
9 + 7	5 + 29	22 + 28
15 + 9	39 + 8	35 + 27
19 + 6	49 + 6	38 + 36

Addition: Adding Up in Chunks

Category 1:	Category 2:	Category 3:
23 + 10	26 + 10	29 + 10
23 + 20	26 + 30	29 + 15
23 + 40	26 + 50	29 + 20
23 + 50	26 + 53	29 + 24

Subtraction: Think Addition (Adding Up)

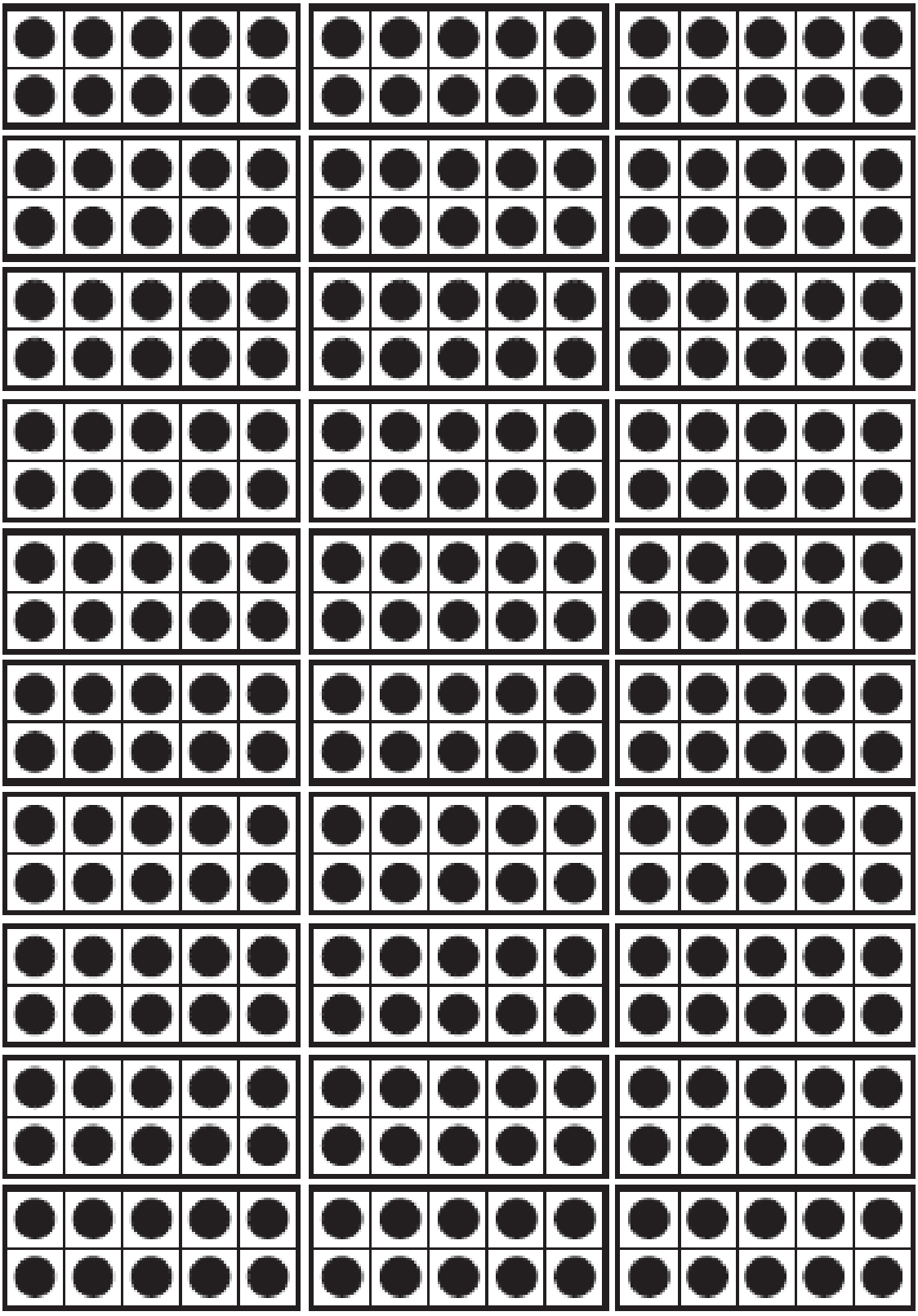
Category 1:	Category 2:	Category 3:
20 – 15	23 – 19	50 – 24
20 – 14	23 – 16	50 – 39
20 – 12	23 – 14	56 – 28
20 – 11	23 – 9	56 – 17

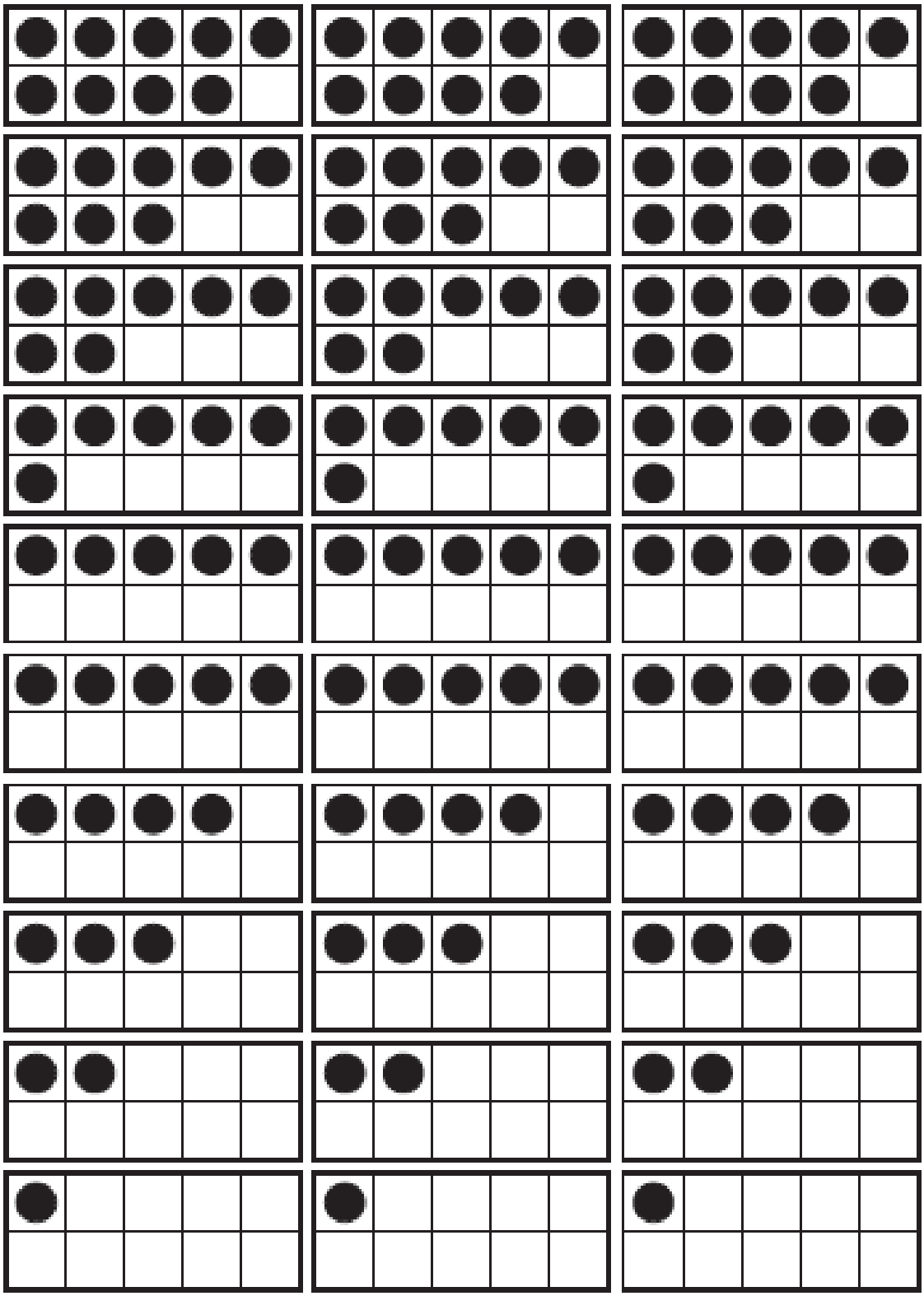
Subtraction: Removal

Category 1:	Category 2:	Category 3:
12 – 2	47 – 10	54 – 10
12 – 5	47 – 16	54 – 18
15 – 5	47 – 20	52 – 30
15 – 6	47 – 24	52 – 34

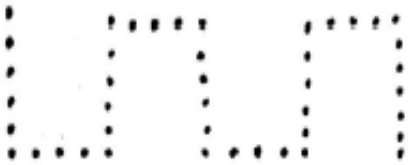
Parrish, S. (2014). *Number Talks: Helping Children Build Mental Math and Computation Strategies.* Sausalito: Math Solutions.

Module 3 Appendix



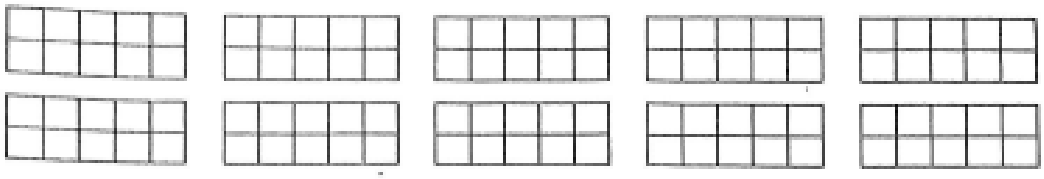


Name _____

Get this many. 	Write the number word Tens _____ Ones _____
Get this many.	Write the number word Tens _____ Ones _____
Get this many.	Write the number word Tens _____ Ones _____
Get this many.	Write the number word Tens _____ Ones _____
Get this many.	Write the number word Tens _____ Ones _____
Get this many.	Write the number word Tens _____ Ones _____

Fill the tens.

Get _____ beans.

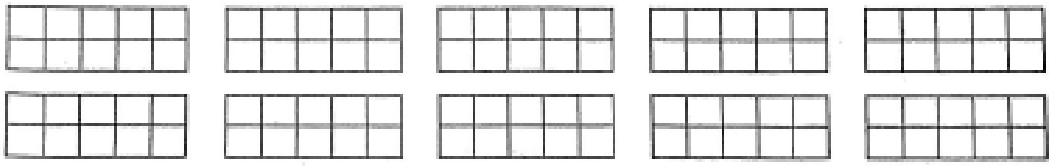


Fill up ten-frames. Draw dots.

Tens _____ Extras _____

Fill the tens.

Get _____ beans.

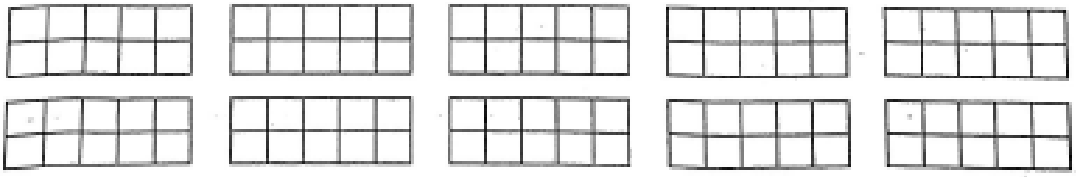


Fill up ten-frames. Draw dots.

Tens _____ Extras _____

Fill the tens.

Get _____ beans.

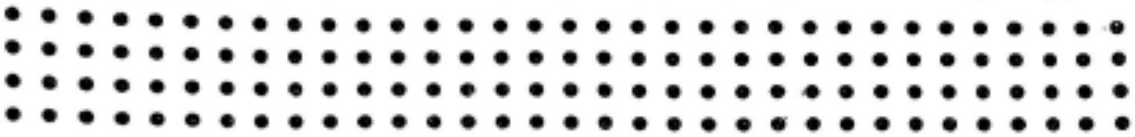


Fill up ten-frames. Draw dots.

Tens _____ Extras _____

Loop this many.

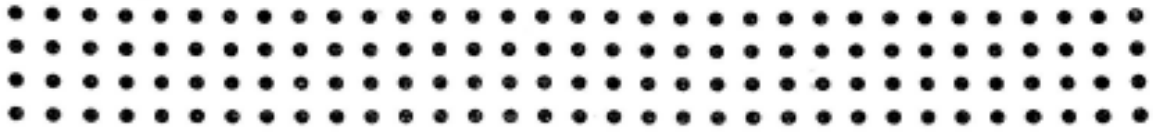
Loop [ ] in groups of ten.



Tens _____ Ones _____

Loop this many.

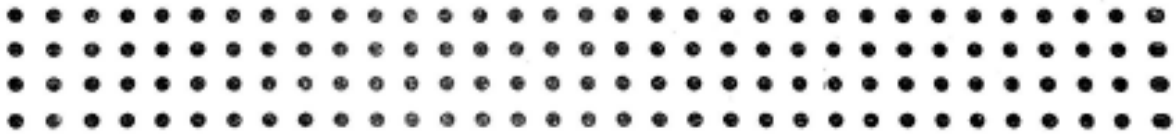
Loop [ ] in groups of ten.



Tens _____ Ones _____

Loop this many.

Loop [ ] in groups of ten.



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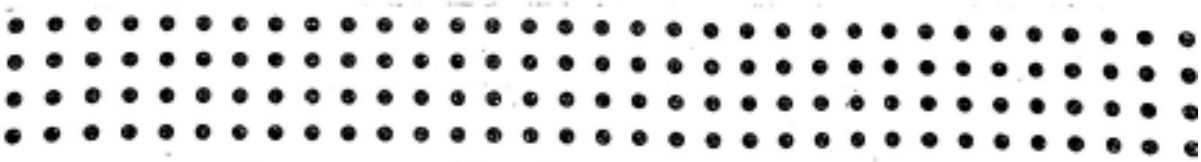
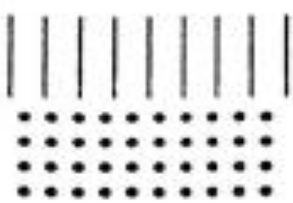
Loop this many.

Loop [ ] in groups of ten.



Tens _____ Ones _____

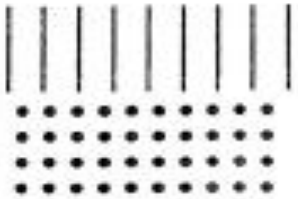
Show _____ three different ways.



Tens _____ Tens _____ Tens _____

Ones _____ Ones _____ Ones _____

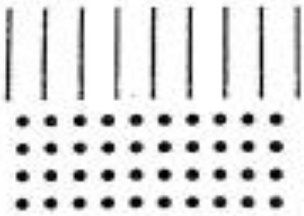
Show _____ three different ways.



Tens _____ Tens _____ Tens _____

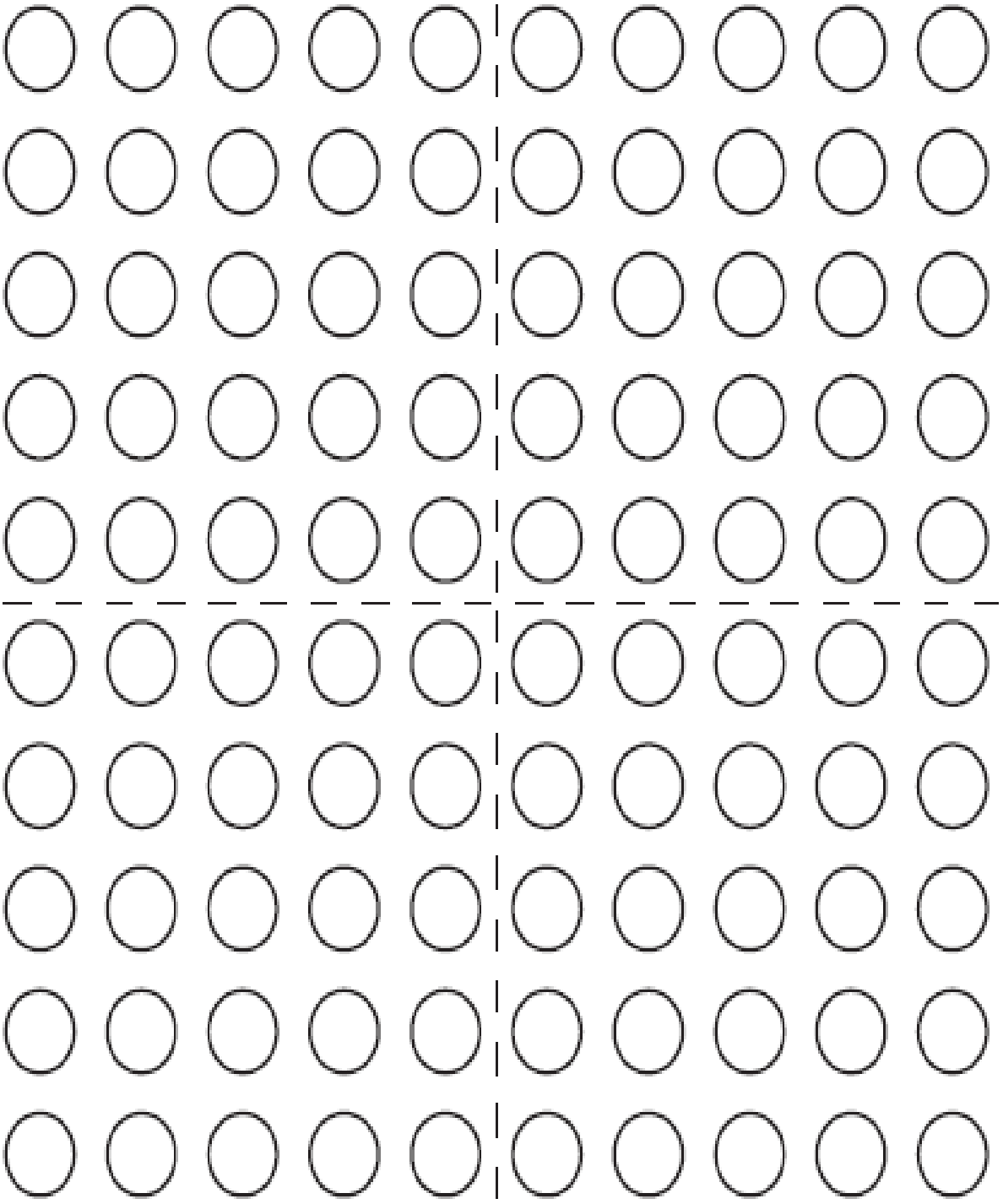
Ones _____ Ones _____ Ones _____

Show _____ three different ways.



Tens _____ Tens _____ Tens _____

Ones _____ Ones _____ Ones _____



Trash Can Game

_____ _____ _____ _____ Trash Can _____ _____ (Try to make the number with the greatest value.)	_____ _____ _____ _____ Trash Can _____ _____ (Try to make the number with the greatest value.)
_____ _____ _____ _____ Trash Can _____ _____ (Try to make the number with the greatest value.)	_____ _____ _____ _____ Trash Can _____ _____ (Try to make the number with the greatest value.)
_____ _____ _____ _____ Trash Can _____ _____ (Try to make the number with the least value.)	_____ _____ _____ _____ Trash Can _____ _____ (Try to make the number with the least Value.)
_____ _____ _____ _____ Trash Can _____ _____ (Try to make the number with the least value.)	_____ _____ _____ _____ Trash Can _____ _____ (Try to make the number with the least Value.)

101 and Out

Player 1_____

Roll #1	Roll #2	Roll #3	Roll #4	Roll #5	Roll #6	Total

Player 2_____

Roll #1	Roll #2	Roll #3	Roll #4	Roll #5	Roll #6	Total

Module 4 Appendix

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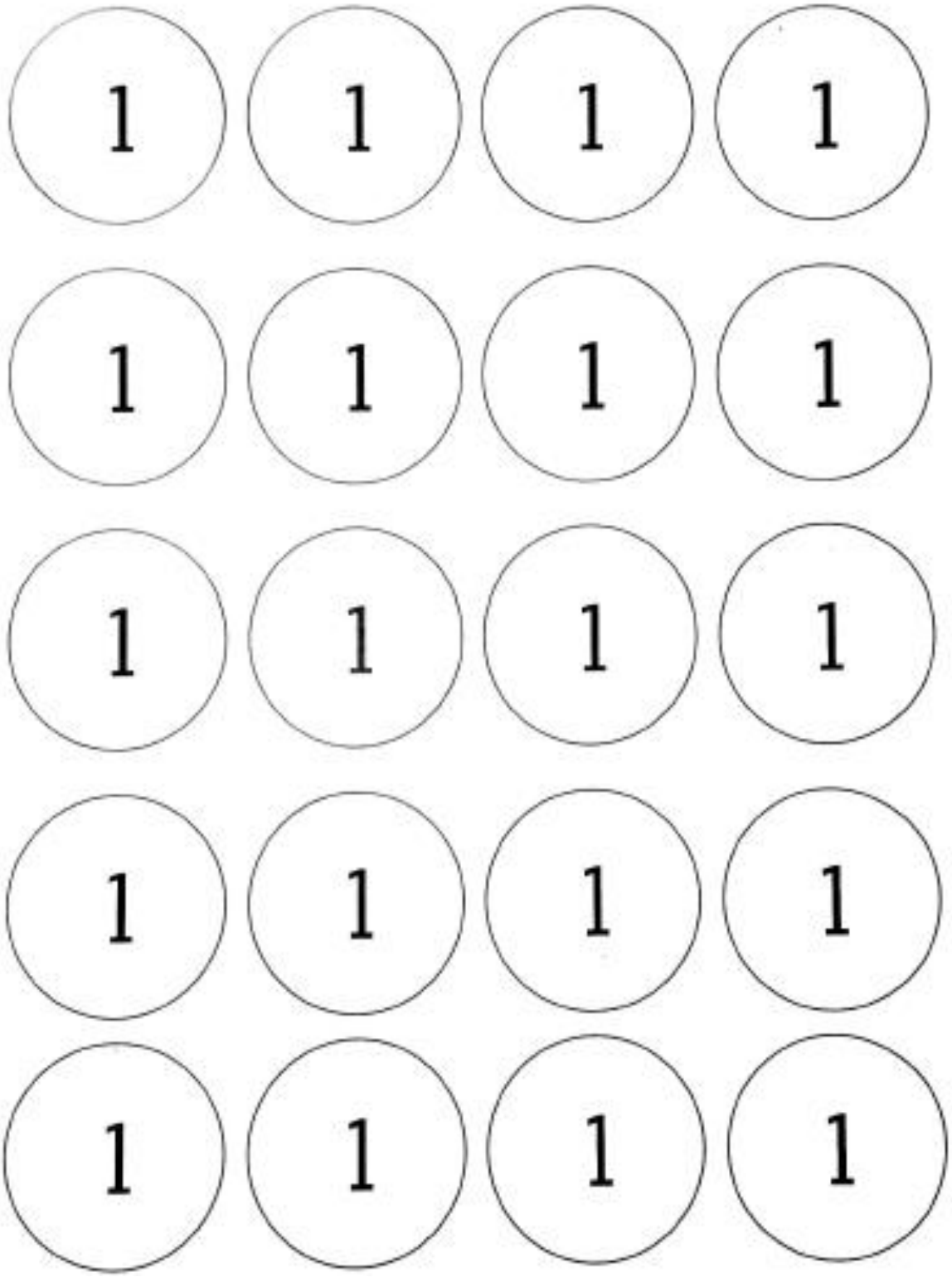
PLACE VALUE DISKS



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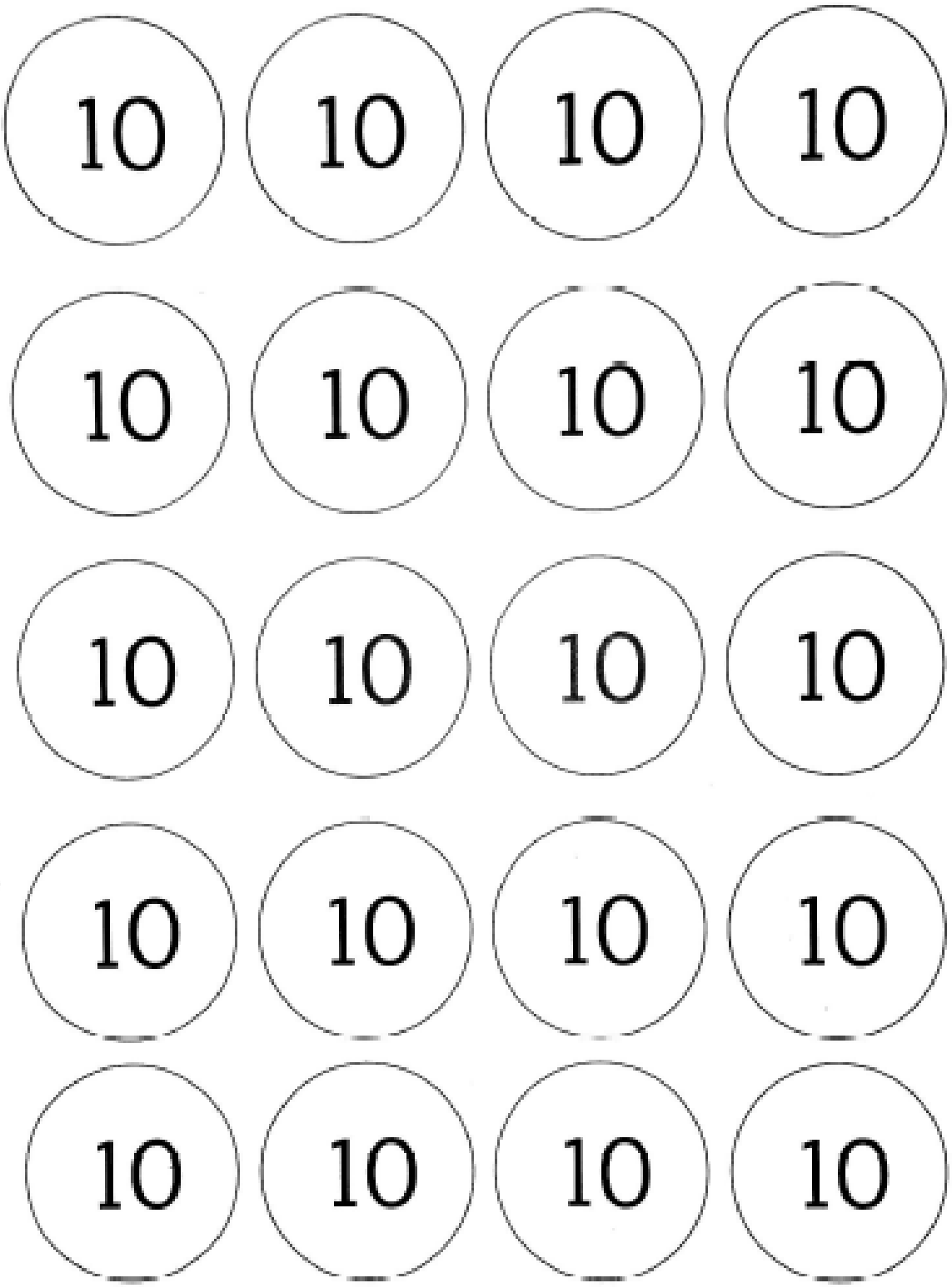
PLACE VALUE DISKS



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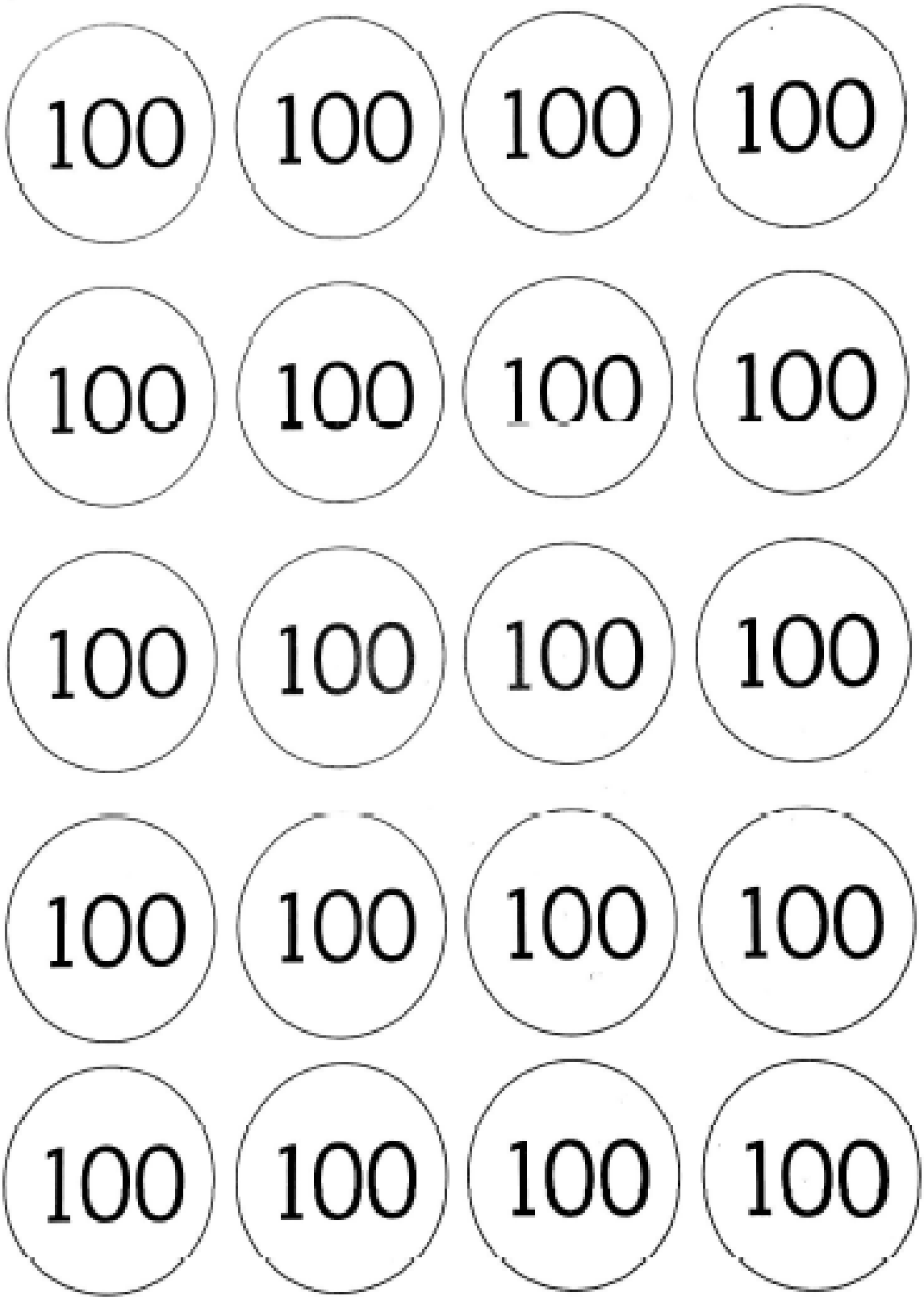
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