BLACKLINES

BRIDGES STUDENT BOOK

5

BRIDGES IN MATHEMATICS

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The MATH LEARNING CENTER

B5SB-B

Unit One: Connecting Mathematical Topics

Unit Two: Seeing & Understanding Multi-Digit Multiplication & Division

Unit Three: Geometry & Measurement

Unit Four: Multiplication, Division & Fractions

Unit Five: Probability & Data Analysis

Unit Six: Fractions, Decimals & Percents

Unit Seven: Algebraic Thinking

Unit Eight: Data, Measurement, Geometry & Physics with Spinning Tops

NAME _____ **DATE** _____

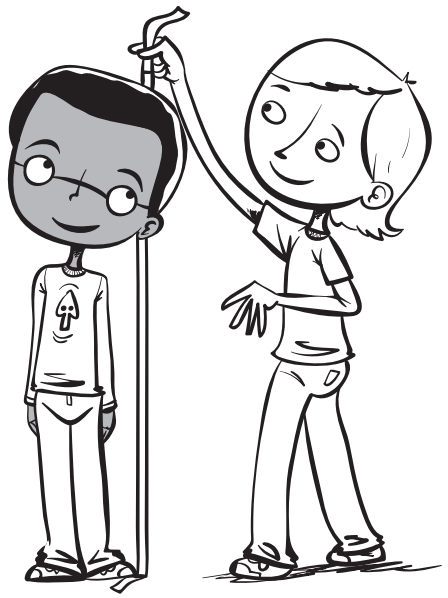
Height Measurement

1 Get a long piece of string. Mark a point on the string a few inches away from the end.

2 Step on the string so that the mark is on the floor and you can see it just next to your shoe.

3 Have your partner lift the string so that it lines up with the top of your head and make a second mark there. The difference between the marks should be equal to your height.

4 Now measure your partner in the same way. Be sure to use his or her string.



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5 Complete the measurements and questions below.

a Use a yardstick to measure the length between the two marks on your string in inches. Record the results below.

My height is _____ inches.

b Use a meter stick to measure the length between the two marks on your string in centimeters. Record the results below.

My height is _____ centimeters.

c How many inches are equal to a foot?

d How many feet are equal to a yard?

e How many inches are equal to a yard?

f How many centimeters are equal to a meter?

NAME _____ **DATE** _____

Mathography page 1 of 2

Answer the following questions as best you can.

1 What is mathematics?

2 How do you feel about math?

3 Do you have any special math memories, good or bad?

(Continued on back.)

NAME _____ **DATE** _____

Mathography page 2 of 2

4 What are some of the things that are easy for you in math?

5 What are some of the things that are more difficult for you right now?

6 What are your goals for the year in math? What would you like to get better at?

NAME _____ **DATE** _____

Height Data

1 Display the height data collected by the class in a way that makes it easy to see and understand. You can make your display in the space below, on the back of this page, or on a piece of grid paper. Here are some ideas that will help:

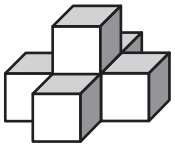
- Use centimeters or inches, but not both.
- You can make a table, chart, graph, or labeled sketch. The goal is to show the data in an organized way instead of all mixed up.
- You can use scratch paper to make a rough draft of your idea before you create your final display.

2 When you have finished your display, work with your partner to write at least three observations about the data. If someone looked at your display, what could he or she find out about the heights of the students in this class?

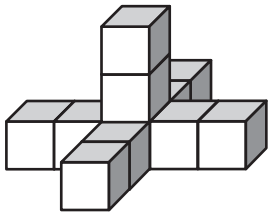
NAME _____ **DATE** _____

Building & Extending Sequences of Cube Arrangements

Arrangement 1



Arrangement 2



Arrangement 3

1 Build the 4th and 5th arrangements in the sequence shown above. What do you notice about the 4th and 5th arrangements?

2 Sketch and label the 4th and 5th arrangements you built. You don't have to make your drawings look 3-dimensional.

3 How many cubes would it take to build the 16th arrangement in this sequence? Show your thinking using number sentences, words, and/or labeled sketches.

CHALLENGE

4 A certain arrangement in this pattern takes 66 cubes to build. Which arrangement is it? Show your thinking using number sentences, words, and/or labeled sketches.

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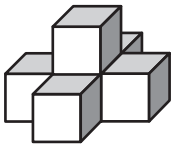
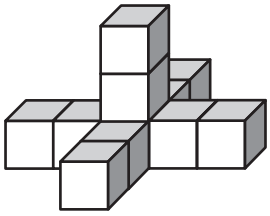
Using Patterns to Solve Problems

You can look at your work on page 7 and on Home Connection 2 to help complete this page. Work with a partner, but fill out your own sheet.

Arrangement 1



Arrangement 2



Arrangement 3

1 A certain arrangement in the sequence above takes 96 cubes to build. Which arrangement is it? Use numbers, words, and/or a labeled sketch to explain your answer.

2 How many cubes would be in arrangement $2\frac{1}{2}$? Use numbers, words, and/or a labeled sketch to explain your answer.

CHALLENGE

3 What do you have to do to figure out how many cubes it takes to make *any* arrangement (or the *n*th arrangement) in this sequence? Use numbers, words, and/or a labeled sketch to explain your answer

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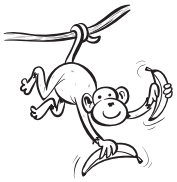
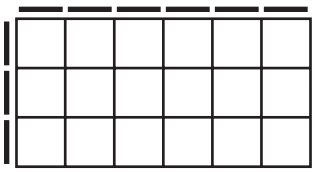
Two Different Kinds of Division Stories Sharing & Grouping



1 Loop and label the array below each problem to show where you can see the bananas and the monkeys. Then write a division equation below each to match.

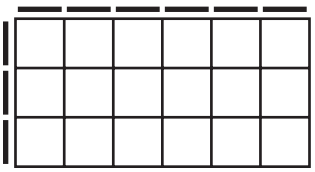
Sharing Division

a The zookeeper had 18 bananas to share among the 3 monkeys. How many bananas did each monkey get?



Grouping Division

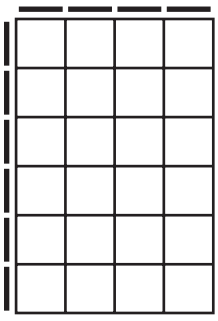
b The zookeeper had 18 bananas and gave 3 to each monkey. How many monkeys were there?



2 Loop and label the array below each problem to show where you can see the kids and the vans. Then write a division equation below each to match.

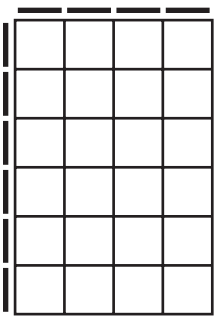
Sharing Division

a 24 kids needed to get to the basketball game at the high school. They had 6 vans. How many kids rode in each van?



Grouping Division

b 24 kids rode in vans to the basketball game. Each van held 6 kids. How many vans were needed to get them there?



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Primes & Composites

1 Make a quick sketch of all the rectangles that can be formed with each number below.

a 24	**b** 31
c 27	**d** 36

2 List all the factors for each number.

a 24	**b** 31
c 27	**d** 36

3 Which of the numbers 24, 27, 31, and 36 are prime? Which are composite?

_____ are prime

_____ are composite

4 Explain how you made your choices above.

NAME _____ **DATE** _____

Add to 15

1 List as many ways as you can to use the numbers 1 through 9 to add up to 15, *without repeating any of the numbers in a single equation.* If you can, try to list *all* possible ways.

example 1 3 + 4 + 8 = 15

example 2 1 + 2 + 3 + 9 = 15

2 List as many ways as you can to use the numbers 1 through 9 to add up to 15, *where 1 or more of the numbers is used twice (but no more than twice) in a single equation*. If you can, try to list *all* possible ways.

example 1 6 + 6 + 3 = 15

example 2 1 + 1 + 2 + 2 + 9 = 15

NAME _____ **DATE** _____

Factor Riddles page 1 of 2

Solve the factor riddles below. You can use a calculator to help if you like. When you finish, try the challenge riddles on the next page.

1 I am a common factor of 28 and 40.
I am an even number.
I am not prime.
What number am I?

2 I am an odd number.
I am a common factor of 27 and 45.
When you multiply me by 3, you get a number greater than 10.
What number am I?

3 I am a common factor of 36 and 48.
I am also a factor of 30.
I am an even number.
I am divisible by 3.
What number am I?

4 I am an even number.
I am greater than 20.
I am a common factor of 76 and 342.
What number am I?

NAME _____ **DATE** _____

Factor Riddles page 2 of 2

CHALLENGE

5 I am an odd number.
I am a common factor of 135 and 210.
I am greater than 7.
What number am I?

6 I am an odd number.
I am a common factor of 210 and 315.
I am greater than 2 times 50.
What number am I?

7 I am a common factor of 693 and 189.
I am also a factor of 525.
I am greater than 10.
What number am I?

8 Write your own riddle for a classmate. You can begin with the prime numbers and then multiply different combinations of them to get starting numbers. Remember that a good riddle requires all clues to solve, and that no single clue should give away the whole riddle. Exchange papers with a classmate and see if you can solve each other's riddles.

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Goldbach's Conjecture

According to the eighteenth century mathematician Christian Goldbach, any even number greater than 2 can be written as the sum of two prime numbers. This statement is known as Goldbach's conjecture, and although many mathematicians suspect it to be true, no one has proved that it must be true for all even numbers.

Experiment with this idea. Write the first ten even numbers as the sums of two prime numbers. (The first four are already done for you below.) Do you notice anything interesting or surprising, or does this idea make good sense to you? Why?

1 4 = 2 + 2

2 6 = 3 + 3

3 8 = 3 + 5

4 10 = 3 + 7 or 5 + 5

5

6

7

8

9

10

NAME _____ **DATE** _____

Order of Operations page 1 of 2

1a List the different answers the class found for $8 + 3 \times 3 - 1$ below.

b For each different answer you and your classmates found, write $8 + 3 \times 3 - 1$ with parentheses to show how you got that answer.

2 Below are four different answers to $10 \times 5 + 2 \div 2$. Place the parentheses where they need to be in each equation to make it work.

a $10 \times 5 + 2 \div 2 = 26$

b $10 \times 5 + 2 \div 2 = 51$

c $10 \times 5 + 2 \div 2 = 35$

d $10 \times 5 + 2 \div 2 = 60$

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Order of Operations page 2 of 2

3 Now think about (20 – 8) ÷ (4 + 2) = _____ .

a Is it possible to come up with more than one answer to this problem? Why or why not?

b Write equations to show how you found the answer(s) to this problem.

CHALLENGE

4 Create an equation that includes at least 3 different operations and has a different answer if you do all calculations from left to right than if you do the calculations using order of operations.

a Here's my equation with the answer if you do the operations from left to right.

b Here's my equation with the answer if you use order of operations.

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Roll 5 Instructions

Instructions for Roll 5

1 Use any method you want to decide which player will go first.

2 Roll any two dice and then multiply the two numbers on the dice. The product is your target number. Record it on your side of the record sheet.

3 Then roll all 5 dice and write these numbers on your side of the sheet.

4 Add, subtract, multiply, or divide any combination of the 5 numbers you just rolled to get to your target number. (You don't have to use all 5 of the numbers you rolled, but use as many as you can because you score a point for each.) If you can't find any way to get to your target number with the 5 numbers you rolled, roll two of the dice and multiply the numbers to get a different target number.

5 With your partner, double-check your equation to make sure it works. Be sure to use parentheses to show how you combined the numbers to get to your target.

6 Count how many numbers you used. You get a point for each number. Record the points in the space provided.

7 Take turns until you have each gone 4 times. Then add up your points. The player with the most points wins.

NAME _____ **DATE** _____

Roll 5 Record Sheet

Player 1 _____ **Player 2** _____

	Player 1	Player 2
Round 1	Target Number ☐ 5 Numbers Rolled ☐ ☐ ☐ ☐ ☐ My Equation _____ Points scored this round _____	Target Number ☐ 5 Numbers Rolled ☐ ☐ ☐ ☐ ☐ My Equation _____ Points scored this round _____
Round 2	Target Number ☐ 5 Numbers Rolled ☐ ☐ ☐ ☐ ☐ My Equation _____ Points scored this round _____	Target Number ☐ 5 Numbers Rolled ☐ ☐ ☐ ☐ ☐ My Equation _____ Points scored this round _____
Round 3	Target Number ☐ 5 Numbers Rolled ☐ ☐ ☐ ☐ ☐ My Equation _____ Points scored this round _____	Target Number ☐ 5 Numbers Rolled ☐ ☐ ☐ ☐ ☐ My Equation _____ Points scored this round _____
Total	**Player 1's Total Score** _____	**Player 2's Total Score** _____

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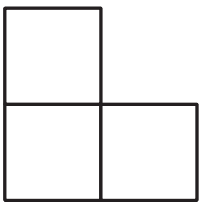
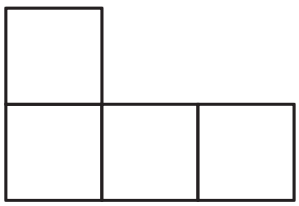
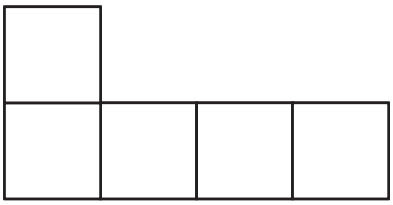
Discovering & Describing Patterns page 1 of 2



Arrangement 1



Arrangement 2



Arrangement 3

1 What do you notice about the 3 arrangements in the sequence above?

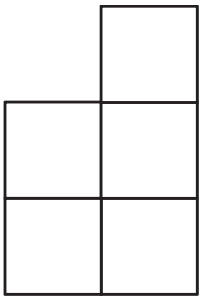
2 Fill in the table below. Make drawings or quick sketches if needed.

Arrangement Number	Number of Tile
4	
10	
100	
	179
	200

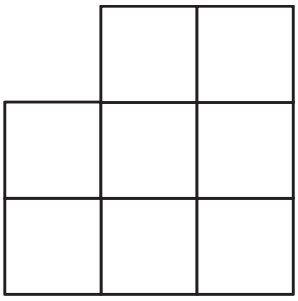
3 What do you have to do to figure out how many tile it takes to make *any* arrangement (or the *n*th arrangement) in this sequence? You can write an expression using *n* or explain your thinking in words. Draw a labeled sketch that shows how you arrived at your answer.

NAME _____ **DATE** _____

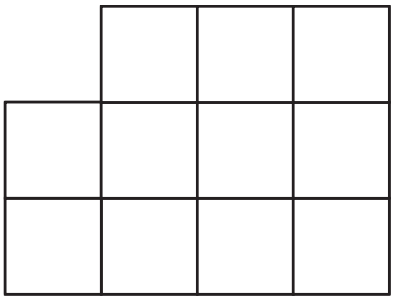
Discovering & Describing Patterns page 2 of 2



Arrangement 1



Arrangement 2



Arrangement 3

4 What do you notice about the 3 arrangements in the sequence above?

5 Fill in the table below. Make drawings or quick sketches if needed.

Arrangement Number	Number of Tile
4	
10	
	47
	92

6 What do you have to do to figure out how many tile it takes to make *any* arrangement (or the *n*th arrangement) in this sequence? You can write an expression using *n* or explain your thinking in words. Draw a labeled sketch that shows how you arrived at your answer.

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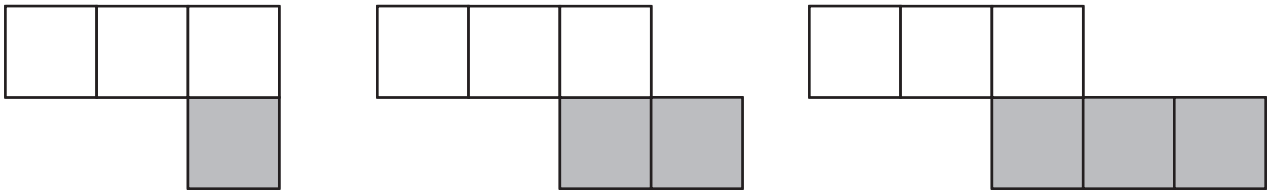
Using Variables



Arrangement 1 Arrangement 2 Arrangement 3

1 What do you have to do to calculate how many tile are in *any* arrangement (or the *n*th arrangement) in the sequence above? You can write an expression using *n* or explain your thinking in words. Draw a labeled sketch that shows how you arrived at your answer.

2 There are 17 tile in arrangement *n*. Explain what *n* equals using labeled sketches, numbers, and words.

3 Gloria made up a new tile sequence. She said that each arrangement in her new sequence has $n + 5$ tile. Draw what the first 3 arrangements in Gloria's sequence of arrangements might look like.

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Charting a Sequence

Create a sequence that has either $n \times 2$ tile in the nth arrangement, $n \times 3$ tile in the nth arrangement, or $n \times 4$ tile in the nth arrangement. Complete the chart below for your sequence.

1 My sequence has _____ tile in the nth arrangement.

Picture of Arrangement	Arrangement Number	Number of Tile in Arrangement
	1	
	2	
	3	
	4	
	5	
		36
		120
	100	

2 Graph the values of your sequence on page 23.

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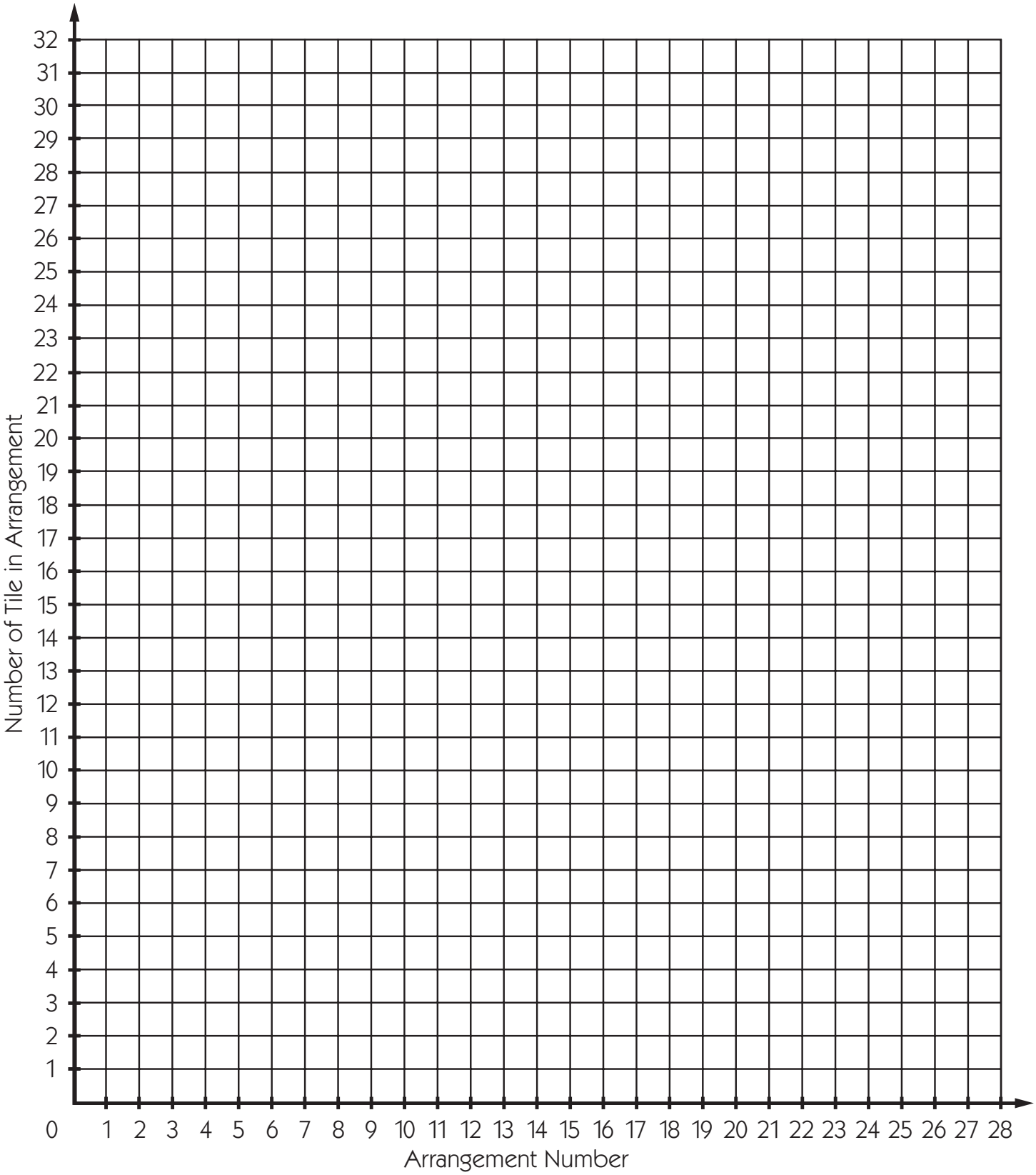
Graphing the Sequence Values



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Number Cube Softball

Number Cube Softball Instructions

1 Each player rolls one 1–6 die. The player with the *lower number* is Player 1.

2 Players take turns, starting with Player 1, rolling the two dice and finding the difference between the two numbers. The difference is the number of runs that player scored in that inning.

3 Players record the number of runs they scored in each inning.

4 The player with the most runs at the end of 9 innings is the winner. If the players have the same number of runs, the game is a tie.

example

	1st Inning	2nd Inning
Player 1's Runs	3	1
Player 2's Runs	0	5

Inning 1: Player 1 rolled a 2 and a 5 and Player 2 rolled a 5 and a 5.
Inning 2: Player 1 rolled a 2 and a 1 and Player 2 rolled a 6 and a 1.

Record the results of your game in the chart below.

	1st Inning	2nd Inning	3rd Inning	4th Inning	5th Inning	6th Inning	7th Inning	8th Inning	9th Inning	Total Runs
Player 1's Runs										
Player 2's Runs										

NAME _____ **DATE** _____

Number Cube Softball Statistics

1 Record the results of your game on the line plot below. Remember to put an X above a number for each time either player scored that number of runs in an inning. The final line plot should have 18 X's.

Runs Scored in a Single Inning

2 Write the number of runs per inning for each player in order from least to greatest. Remember to include all 18 numbers, even if you need to repeat some of them.

3 Find the range, mode, and median number of runs per player per inning. As an *optional* challenge, you can also find the mean (average) number of runs per player per inning.

a range	**c** median
b mode	**d** mean

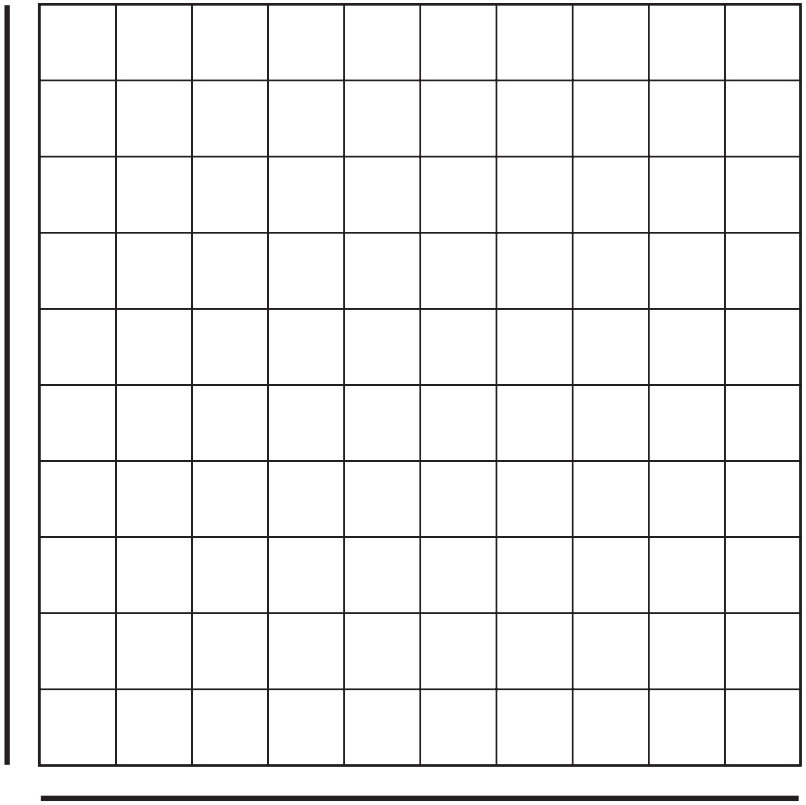
NAME _____ DATE _____

Base Ten Pieces

1 Label the side lengths or *dimensions* of each base ten piece in centimeters (cm).

2 Label the *area* of each base ten piece in square centimeters (sq. cm).

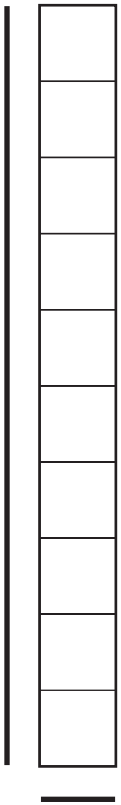
mat



Dimensions: _____

Area: _____

strip



Dimensions: _____

Area: _____

unit

Dimensions: _____

Area: _____

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Puzzling about 100

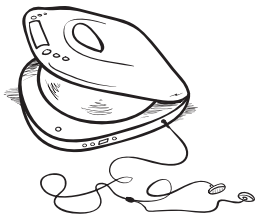
Here are some number puzzles for you to work on when you have time.

1 Use any of the four operation signs (+, –, ×, or ÷) to make the equation below true. You can use a calculator to help, but you have to leave all the digits in the same order they are now.

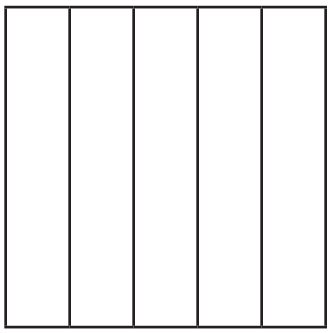
1 2 3 4 5 6 7 8 9 = 100

2 Mrs. Williams went to the Learning Palace to buy some new games, books, and pencils for her classroom. The games cost $10.00 each, the books cost $5.00 each, and the pencils cost $0.50 each. She bought 100 items and spent exactly $100.00. How many games, books, and pencils did she buy?

3 Drexler bought a CD player and a CD for $110.00. The CD player cost $100.00 more than the CD. How much did he pay for each? (Hint: Double-check your answer.)



4 This square is divided into 5 congruent rectangles. (Congruent means they are all exactly the same size and shape.) The perimeter of each rectangle is 24 meters.



a What is the perimeter and area of the square?

b What is the perimeter of the square in centimeters?

c What is the area of the square in square centimeters?

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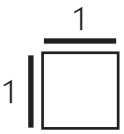
Multiplying by 1, 11, 111, and So On page 1 of 2

CHALLENGE

1 Quickly sketch an array to show the following multiplication problems. Then write an equation to show your solution. The first one is done as an example for you.

a 1 × 1



1 × 1 = 1

b 11 × 11

c 111 × 111

2 Based on your work above, predict the products for the following combinations.

a 1111 × 1111

b 11111 × 11111

3 Use any strategy you like to calculate the two products. Were your predictions correct?

a 1111 × 1111

b 11111 × 11111

NAME _____ **DATE** _____

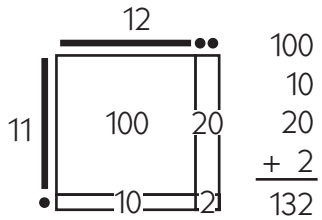
Multiplying by 1, 11, 111, and So On page 2 of 2

4 Quickly sketch an array to show the following multiplication problems. Then write an equation to show your solution. The first two are done as examples for you.

a 12 × 1

12 × 1 = 12

b 12 × 11



12 × 11 = 132

c 12 × 111

5 Use any strategy you like to calculate the two products below.

a 12 × 1111

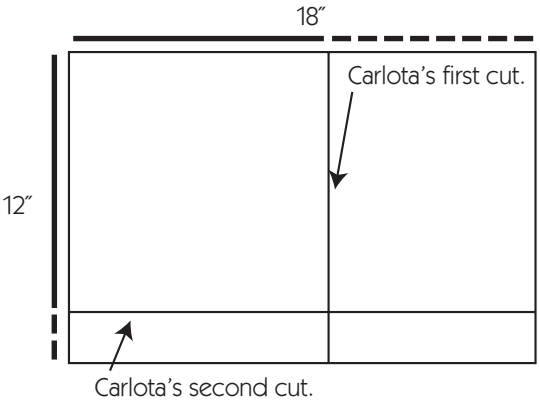
b 12 × 11111

6 What patterns do you notice in your work in problems 1–5?

NAME _____ **DATE** _____

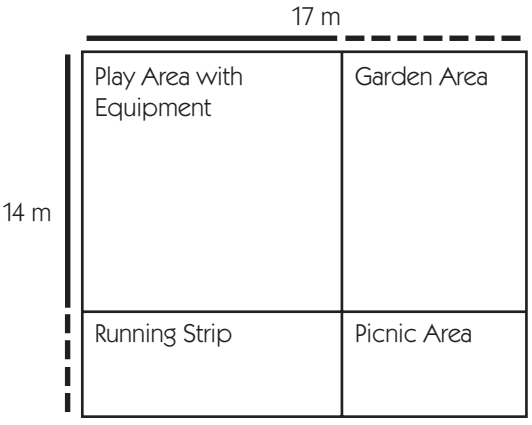
Multiplication Sketches page 1 of 2

1a Carlota has a piece of construction paper that is 12 inches by 18 inches. She needs a square that is 10 inches by 10 inches, so she makes two cuts in the paper. After making the cuts, Carlota gets her 10-by-10 square and three other pieces. Use a multiplication equation to label the area (in square inches) of each piece in the picture below.



b Determine the total area of the original 12-by-18-inch piece of paper.

2a The Woodlawn Preschool has a small playground that measures 17 meters by 14 meters. They want to divide it into different sections: a play area with equipment, a garden area, a picnic area, and a running strip. The playground is shown below. Use a multiplication equation to label the area (in square meters) of each piece in the picture below.

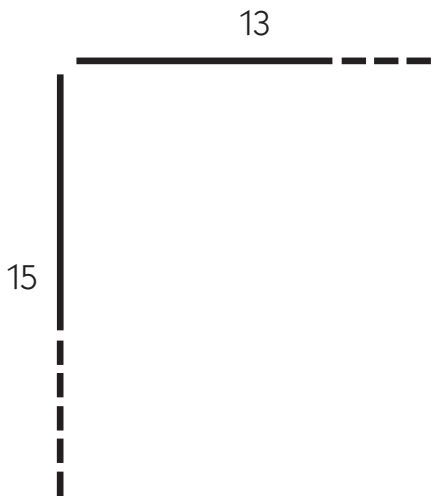


b What is the total area of the entire 17-by-14-meter playground?

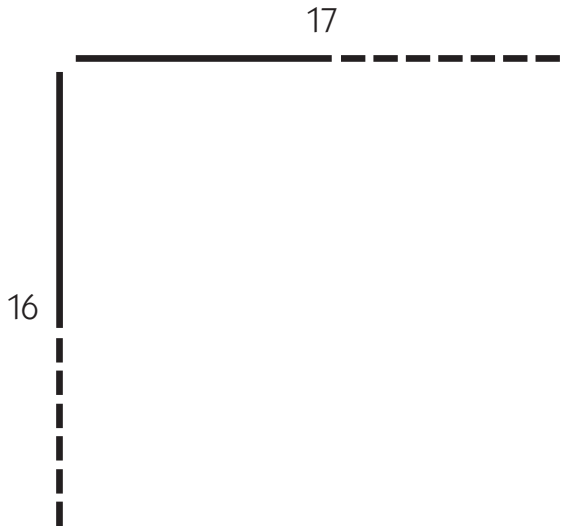
NAME _____ **DATE** _____

Multiplication Sketches page 2 of 2

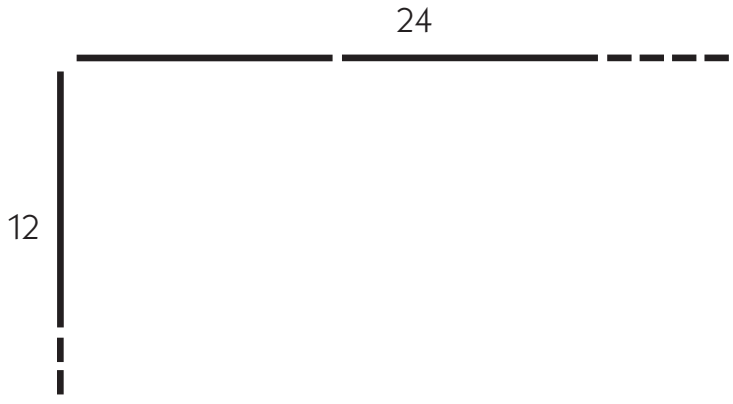
Sketch an array for each of the skeletons below, and label each part with a multiplication equation to show its area. Then find the total product of each array.



3 15 × 13 =



4 16 × 17 =



5 12 × 24 =

NAME _____ **DATE** _____

Double-Digit Multiplication page 1 of 2

Find the product of each pair of numbers below, and show all of your work. You can quickly sketch and label an array for some or all of the problems if you like.

example

$$\begin{array}{r} 23 \\ \times 26 \\ \hline \end{array}$$

1

$$\begin{array}{r} 28 \\ \times\ 26 \\ \hline \end{array}$$

2

$$\begin{array}{r} 24 \\ \times\ 23 \\ \hline \end{array}$$

3

$$\begin{array}{r} 24 \\ \times\ 36 \\ \hline \end{array}$$

4

$$\begin{array}{r} 35 \\ \times\ 29 \\ \hline \end{array}$$

NAME _____ **DATE** _____

Double-Digit Multiplication page 2 of 2

Find the product of each pair of numbers below, and show all of your work. You can quickly sketch and label an array for some or all of the problems if you like.

5

$$\begin{array}{r} 33 \\ \times\ 25 \\ \hline \end{array}$$

6

$$\begin{array}{r} 34 \\ \times\ 33 \\ \hline \end{array}$$

7

$$\begin{array}{r} 37 \\ \times\ 32 \\ \hline \end{array}$$

8

$$\begin{array}{r} 37 \\ \times\ 39 \\ \hline \end{array}$$

NAME _____ **DATE** _____

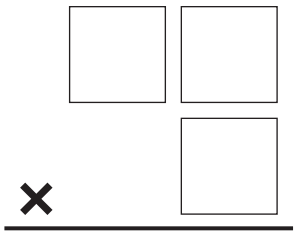
Roll Your Own Multiplication Problems

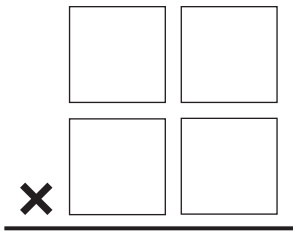
1 Choose a die numbered 1–6 or 4–9.

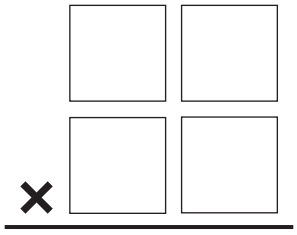
2 Roll it as many times as you need to fill in each of the boxes below. You can place each number that you roll in any box on the sheet, but once all the boxes are filled, you can't change them.

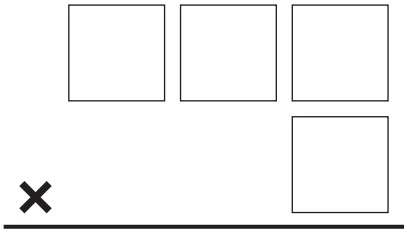
3 Use the standard multiplication algorithm to solve your problems.

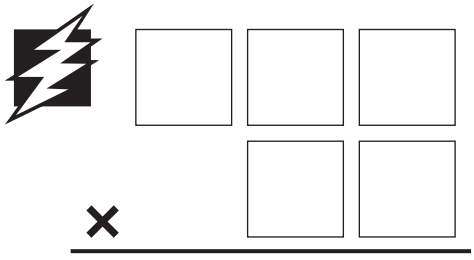
4 When you're finished, trade papers with a classmate and have him or her check your answers.

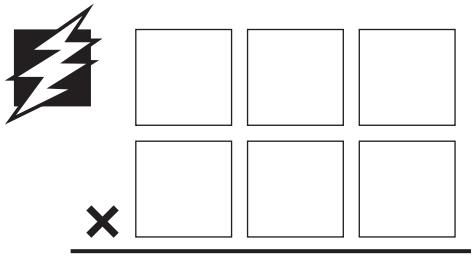












NAME _____ **DATE** _____

Reviewing Multiplication Strategies

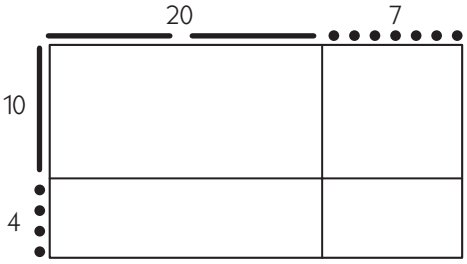
Read and review these multiplication strategies with your class. Then complete the example in each strategy box, 1–5.

1 Use basic fact strategies.

example 32 × 4 Double it and then double it again.

2 Use an area model divided into four regions.

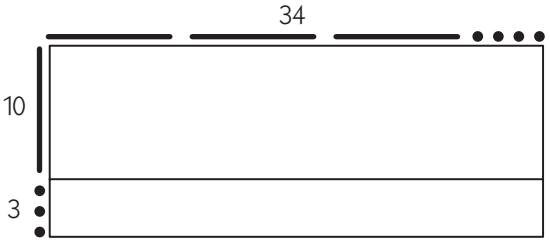
example 14 × 27



$$\begin{array}{r} 27 \\ \times 14 \\ \hline \end{array}$$

3 Use an area model divided into two regions.

example 13 × 34



$$\begin{array}{r} 34 \\ \times 13 \\ \hline \end{array}$$

4 Multiply to get four partial products and add them up.

example

$$\begin{array}{r} 35 \\ \times 28 \\ \hline \end{array}$$

$20 \times 30 =$
$20 \times 5 =$
$8 \times 30 =$
$8 \times 5 =$

5 Multiply by the tens and then by the ones. Add the partial products to get the answer.

example

$$\begin{array}{r} 25 \\ \times 23 \\ \hline \end{array}$$

$20 \times 25 =$
$3 \times 25 =$

NAME _____ **DATE** _____

Evaluating Multiplication Strategies page 1 of 2

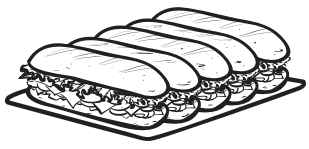
For each problem on this page and the next write the letter of the strategy you think will work best or think of your own strategy (but *not* repeated addition). Then use the strategy to solve the problem. Think about whether or not you need to compute an exact answer.

1 You're helping your mom buy bottled water for an all-school field trip. There are 24 bottles in each case, and she asks you to figure out how many bottles there would be in 14 cases.

I think strategy ____ will work best for this problem.

2 You're standing in line waiting to buy 5 sandwiches for your family. Each sandwich costs $3.20, including tax. You suddenly panic and wonder if the $20 bill your mom gave you will be enough. You have to figure it out before you get to the checkstand.

I think strategy ____ will work best for this problem.



NAME _____ **DATE** _____

Evaluating Multiplication Strategies page 2 of 2

3

$$\begin{array}{r} 142 \\ \times\ \ 8 \\ \hline \end{array}$$

I think strategy ____ will work best for this problem.

4

$$\begin{array}{r} 36 \\ \times\ 27 \\ \hline \end{array}$$

I think strategy ____ will work best for this problem.

NAME _____ **DATE** _____

Raising Funds for Outdoor School page 1 of 3

The 27 students in Mr. Reeves' fifth grade class want to spend a weekend at Outdoor School. They want to plan ahead so that they can work together to raise money to help cover the expenses for the whole class. Use the information below to figure out how much money each student will need for food, transportation, and lodging, as well as how much money they will need to raise as a class.

1a The students plan to arrive on a Friday and leave that Sunday. They will sleep in bunkhouses on Friday and Saturday nights. The cost of renting a bunkhouse is $12 per student per night. What will be the total cost of renting a bunkhouse for each student?

b What will be the total bunkhouse rental cost for the whole class?

2 The class will need to rent a bus to drive them to and from Outdoor School. Each student's share of the bus rental is $10.50. What is the total cost of renting the bus?

NAME _____ **DATE** _____

Raising Funds for Outdoor School page 2 of 3

3 The class plans to arrive at Outdoor School on a Friday around lunchtime and leave on Sunday after lunch. On Friday, they will eat lunch and dinner at Outdoor School. On Saturday, they will eat breakfast, lunch, and dinner. On Sunday, they will eat breakfast and lunch before they leave. Each student will also get one snack on Friday and Sunday, and two snacks on Saturday. The cost of each meal is $4.50 and the cost of each snack is $0.75.

a What will be the total cost of the meals and snacks for each student?

b What will be the total cost of meals and snacks for the whole class?

4 The students decided that it was reasonable to ask each student's family to contribute $35 to the cost of going to Outdoor School. As a class, how much more money will they need to raise altogether to cover the cost of Outdoor School?

NAME _____ **DATE** _____

Raising Funds for Outdoor School page 3 of 3

CHALLENGE

5a If the students raised $1134 as a class, how much would each student have to pay to cover the cost of Outdoor School?

b Find a second way to solve this problem.

6a Mr. Reeves wants to buy some snacks for the students to eat on the bus. He knows that his students like graham crackers and fruit strips. He found a pack of six 14-ounce boxes of graham crackers for $19.58. The store was also offering 60 cents off each 16-ounce box of another brand of graham cracker, which originally sold for $3.99. Which was a better buy?

b Mr. Reeves had $30 left to spend after buying graham crackers. He wanted to buy as many pouches of fruit snacks with that money as possible. He had the following choices:

- A box of 10 pouches for $4.29
- A box of 12 pouches for $4.99
- A bag of 24 pouches for $20.25
- A box of 30 pouches for $23.40
- Individual pouches beside the cash register for $0.89 each

How can he get the most pouches of fruit snacks with the $30 he has left?

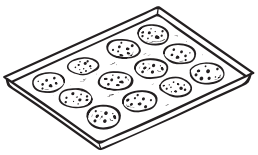
NAME _____ **DATE** _____

Division Story Problems page 1 of 2

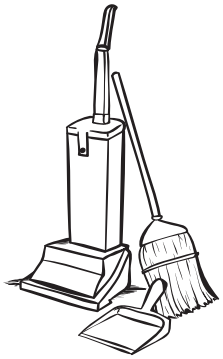
Use base ten pieces to solve the problems on this page and the next. For each problem,

- write a division equation to match the problem.
- label your answer with the correct units.
- explain what you did with the remainder and why.

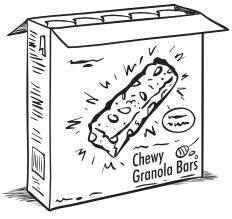
1 Siri and his 3 friends baked cookies last Saturday. When they were finished, they had 57 cookies to share equally. How many cookies did each of the 4 people get?



2 Six friends did chores all day Saturday and earned $75.00. They shared the work equally, so they want to share the money equally. How much money will each person get?



3 Mrs. O'Donnell needs 63 granola bars for the fifth grade field trip. If there are 5 granola bars in a box, how many boxes will she need to buy?

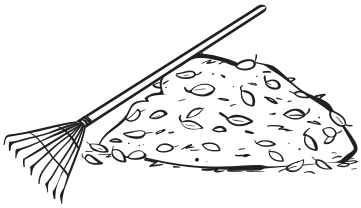


NAME _____ **DATE** _____

Division Story Problems page 2 of 2

4 89 kids showed up for the first soccer practice. The coaches organized them into groups of 4 for warm-up exercises. How many groups were there?

5 Four friends raked leaves every weekend for a month. By the end of the month, they had earned $87.00. When they split the money equally, how much did each friend get?



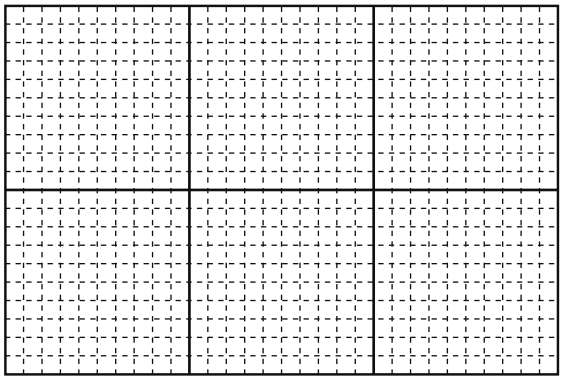
6 The drivers at Pizza Palace were loading up their 3 delivery vans for the evening. There were 65 pizzas. The boss told them to put an equal number of pizzas in each van and said they could split any leftovers equally. How much of a leftover pizza did each of the 3 drivers get?

NAME _____ **DATE** _____

Quotients Win, Game 2

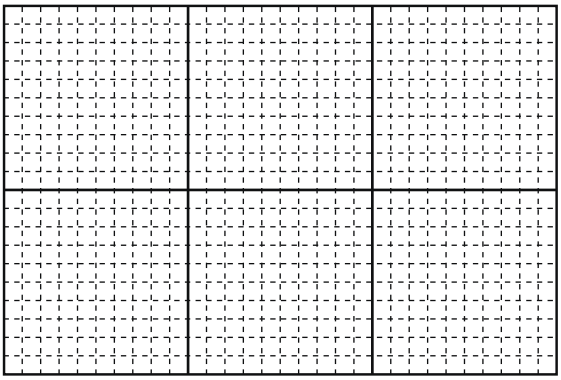
Red Team _____ **Blue Team** _____

1



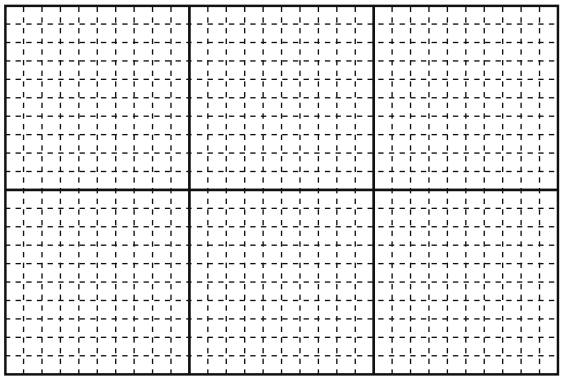
140 ÷ 10 = _____

2



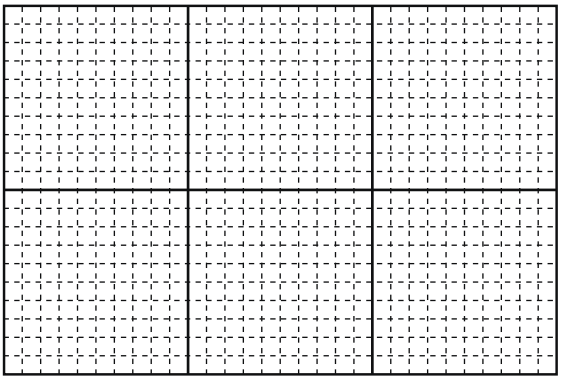
300 ÷ 20 = _____

3



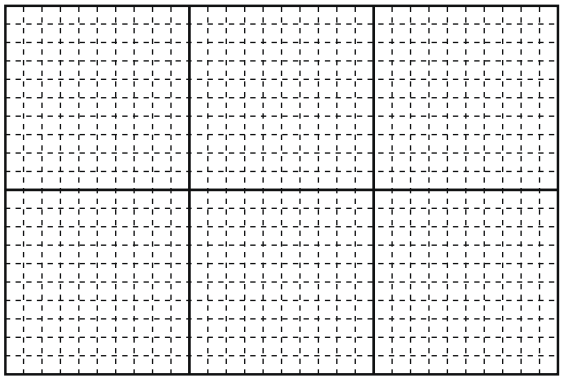
100 ÷ 20 = _____

4



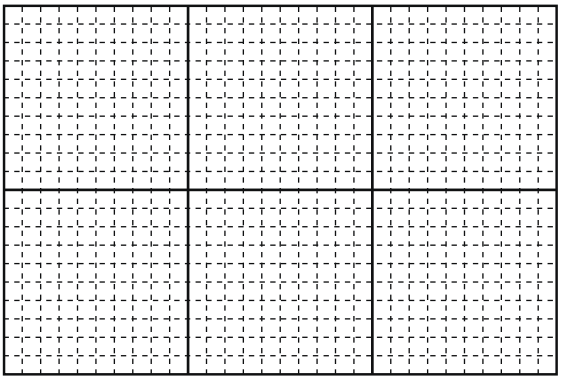
150 ÷ 15 = _____

5



100 ÷ 10 = _____

6



260 ÷ 10 = _____

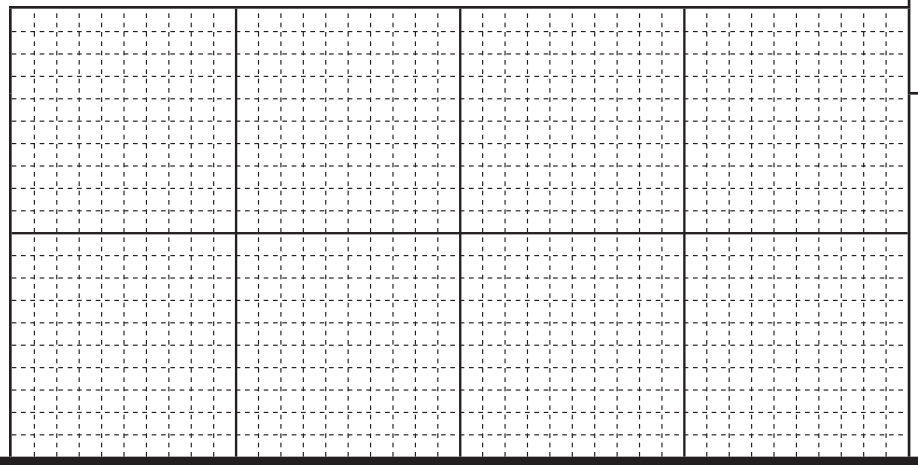
Red Team Score _____ Blue Team Score _____

NAME _____ DATE _____

Division Showdown Record Sheet page 1 of 2

Red Team Player _____ **Blue Team Player** _____

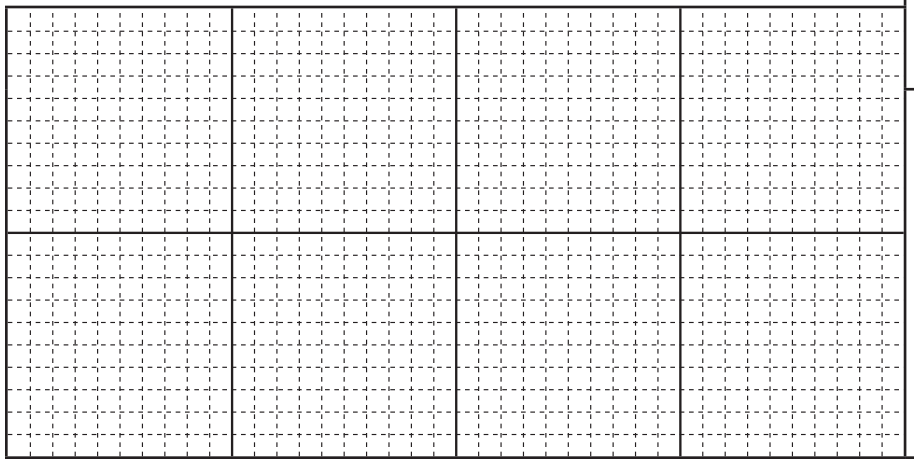
Round 1



Division Problem

Red _____ Blue _____

Round 2



Division Problem

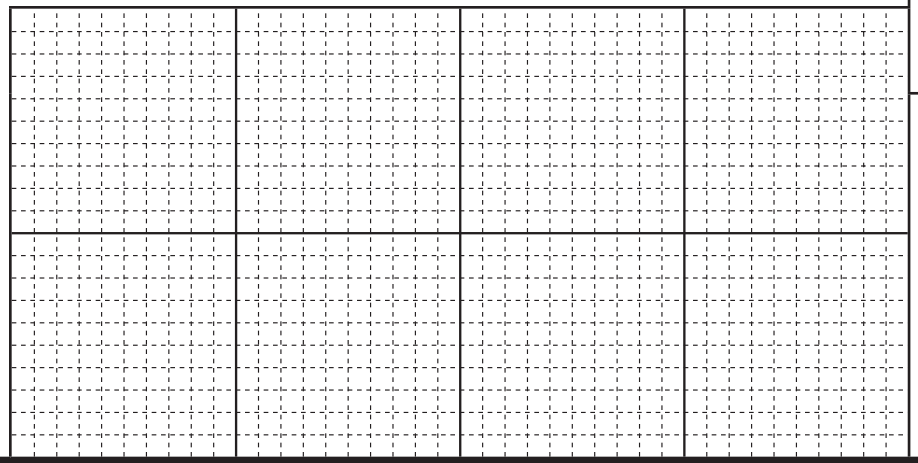
Red _____ Blue _____

NAME _____ DATE _____

Division Showdown Record Sheet page 2 of 2

Red Team Player _____ Blue Team Player _____

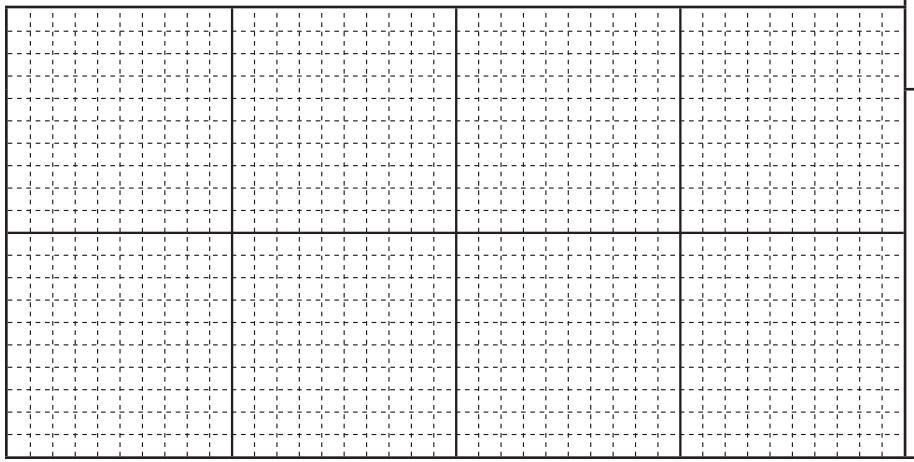
Round 3



Division Problem

Red _____ Blue _____

Round 4



Division Problem

Red _____ Blue _____

Red Score _____ Blue Score _____

NAME _____ **DATE** _____

Division Challenge Problems page 1 of 2

CHALLENGE

Show your work and explain your answers for each problem below using labeled sketches, numbers, and/or words.

1 At the ice cream store on the corner, a single scoop cone costs $\frac{1}{5}$ less than a double scoop cone. If a double costs $1.95, how much does a single cost?

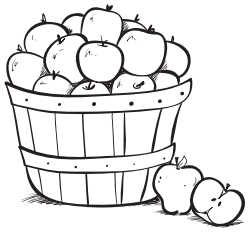
2 Mr. Smith went to 4 different fruit stands looking for the best buy on apples. If he chooses the fruit stand with the best price, how many pounds of apples can he buy for $4.50?

Granny's Fruit Stand: 3 pounds for $1.00

DJ's Fancy Fruit: 4 pounds for $1.24

Holly's Apples & Pears: 2 pounds for $1.00

Tom's Place: 5 pounds for $1.50



NAME _____ **DATE** _____

Division Challenge Problems page 2 of 2

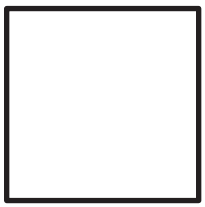
3 I have read $\frac{3}{4}$ of my book and I'm on page 81. How many pages are there in my book, and how many do I have left to read?

4 Choose any number. It can be as big or small as you like. Multiply it by 3. Add 48 to your result. Now divide by 3. Then subtract the original number you picked from this answer. Last, divide by 16. What is the final result? Try this with 5 different starting numbers. Do you think it will work the same with any number? Why do you think it works this way?

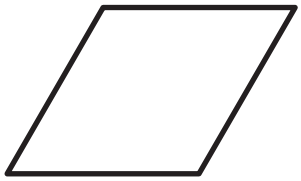
NAME _____ **DATE** _____

Which Is Bigger?

Below are two pattern blocks.



orange square



blue rhombus

1 Which of the following is true?

○ The orange square is smaller than the blue rhombus.

○ The orange square and the blue rhombus are exactly the same size.

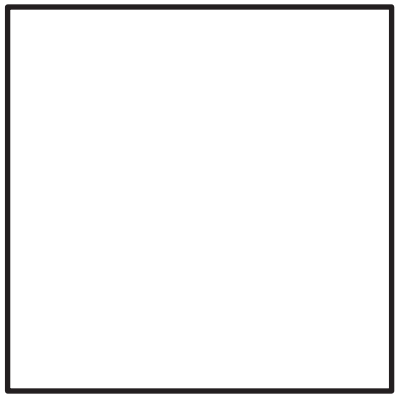
○ The orange square is bigger than the blue rhombus.

2 Explain why you made the choice you did in question 1, using numbers, sentences, and/or labeled sketches. You may use any tools you wish, including rulers, graph paper, pattern blocks, and the enlarged pattern blocks on the next page, to prove your point.

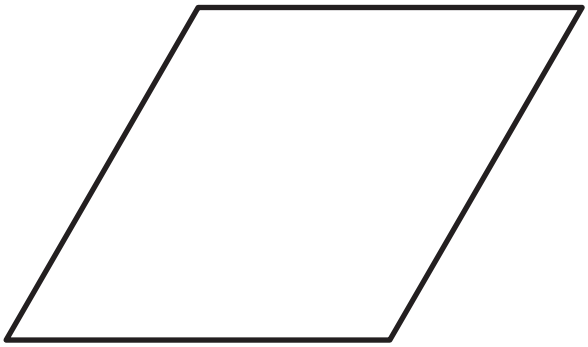
NAME _____ **DATE** _____

Enlarged Pattern Blocks

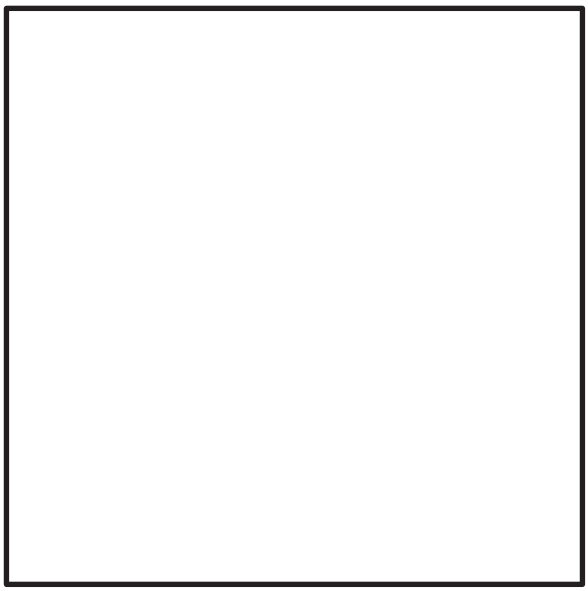
Here are pattern blocks that are larger than the ones in the pattern block set.



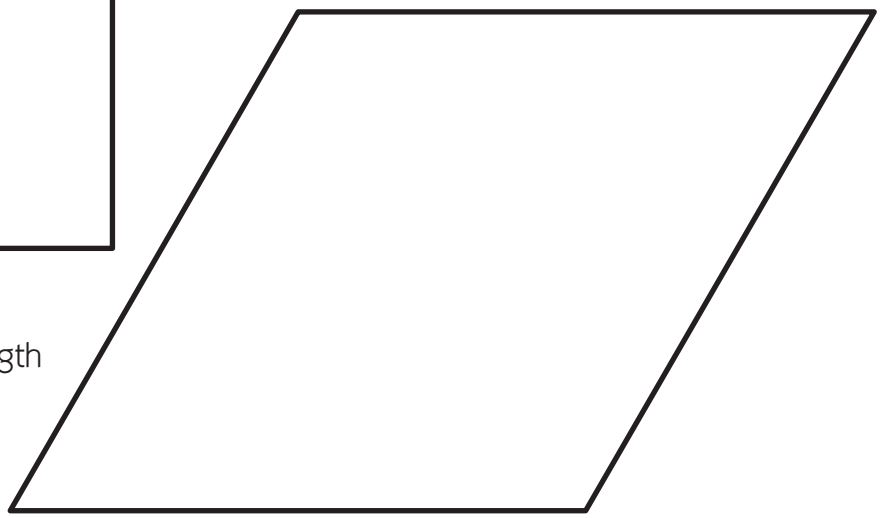
orange square
Each side is twice the length
of the original.



blue rhombus
Each side is twice the length
of the original.



orange square
Each side is 3 times the length
of the original.



blue rhombus
Each side is 3 times the length
of the original.

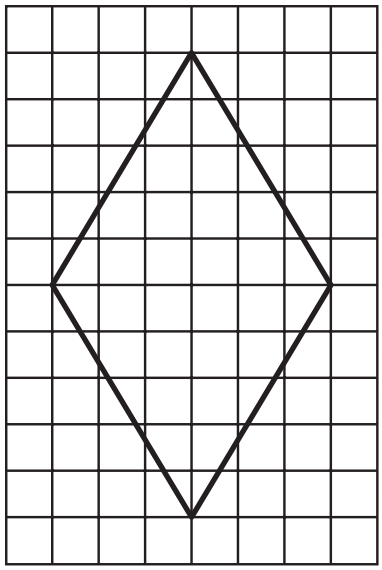
NAME _____ **DATE** _____

Area of a Rhombus page 1 of 2

CHALLENGE

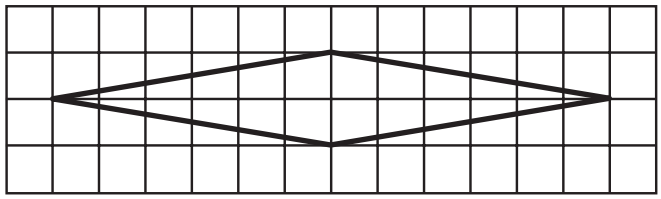
1 Determine the area of each rhombus below. Show all your work for each one.

a



Area = _____ sq. units

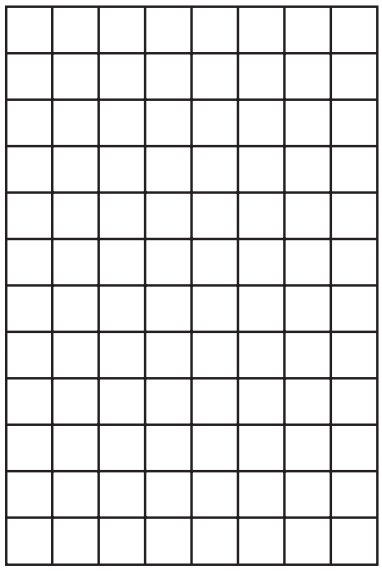
b



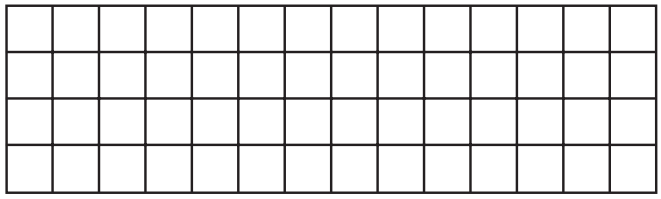
Area = _____ sq. units

2 Draw a rectangle that has an area equal to the corresponding rhombus above. Label the dimensions of each rectangle.

a



b

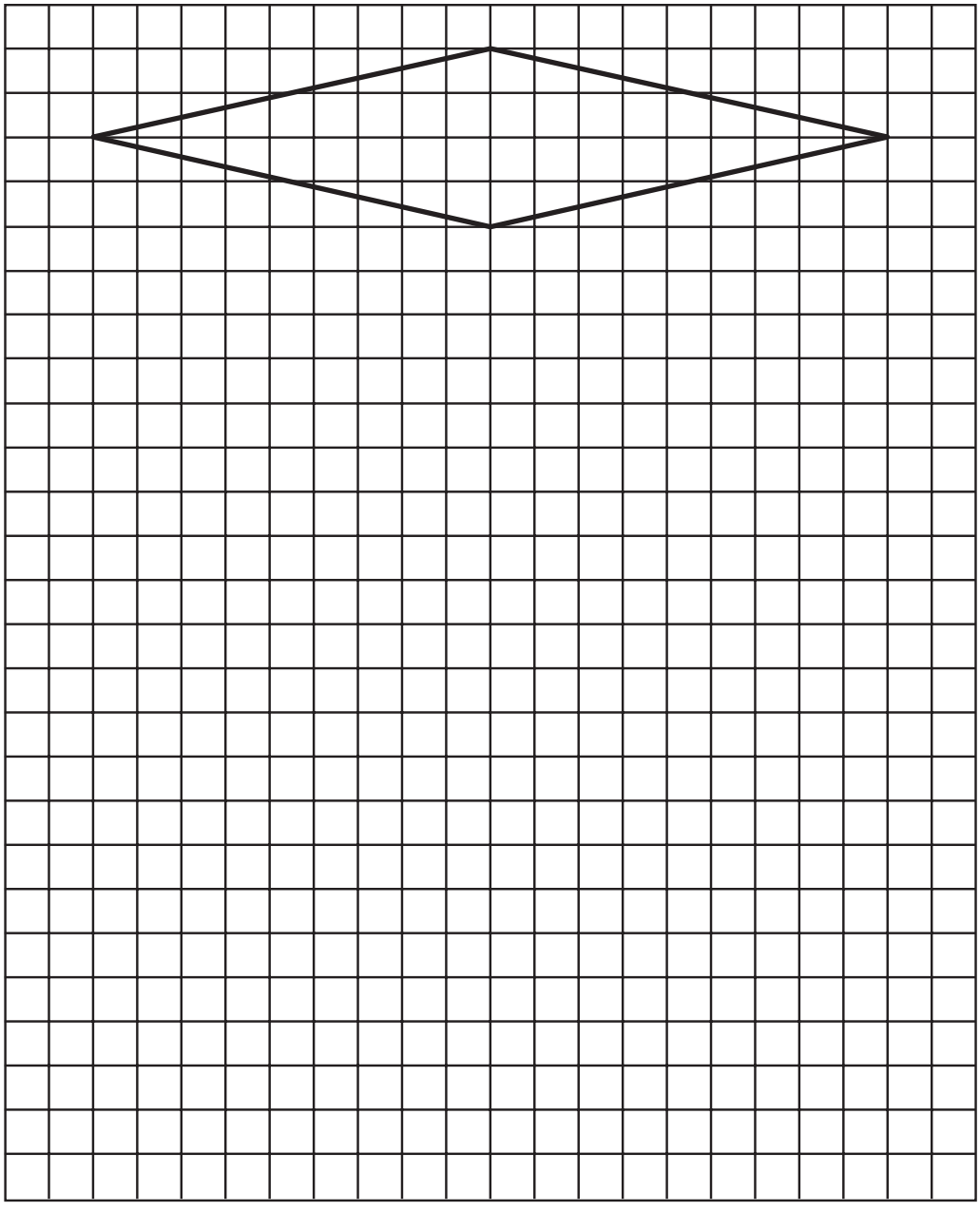


NAME _____ **DATE** _____

Area of a Rhombus page 2 of 2

CHALLENGE

3 On the grid below, draw a square, a rectangle, an isosceles triangle, and a right triangle that all have the same area as the rhombus. Label the dimensions of all of your shapes.



4 In your journal, draw another rhombus. Then draw as many rectangles (including squares), triangles, and other shapes as you can that all have the same area.

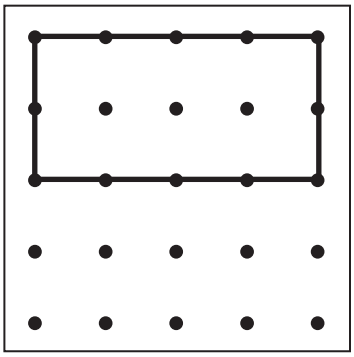
NAME _____ **DATE** _____

Dividing a Rectangle page 1 of 2

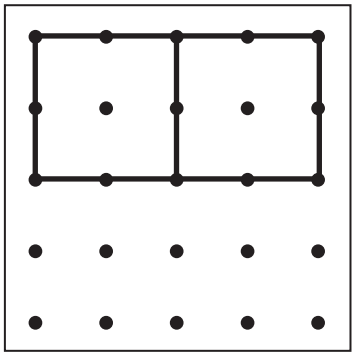
1 Make the rectangle at right on your geoboard.

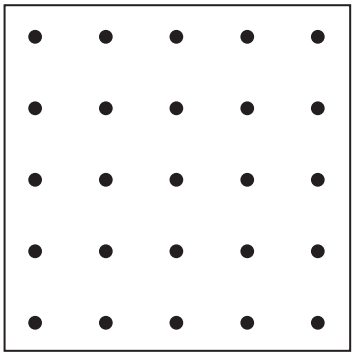
2 Using other geobands, divide the rectangle into two congruent shapes.

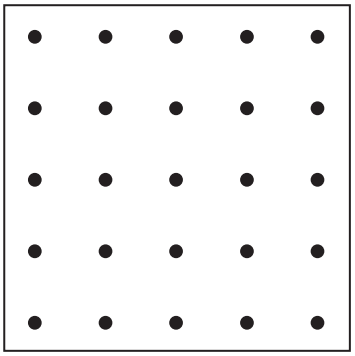
3 Record the different ways you can divide this rectangle into two congruent shapes. One possibility is shown below.

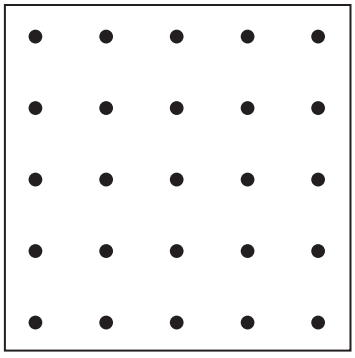


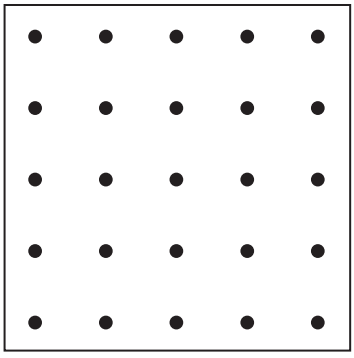
example:

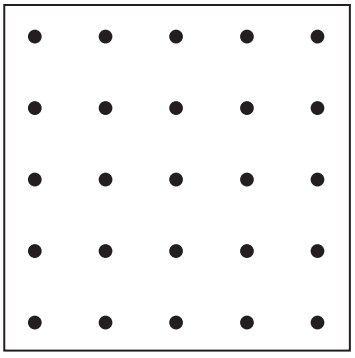


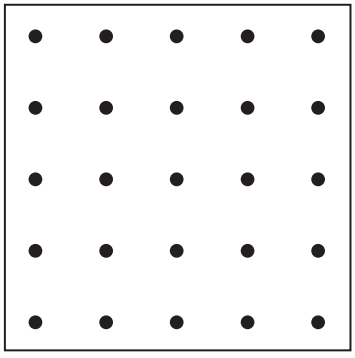


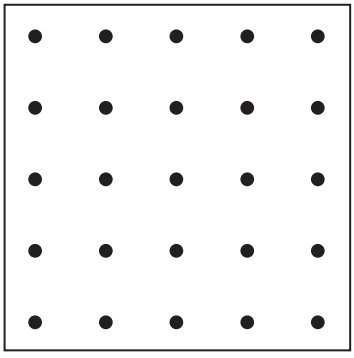


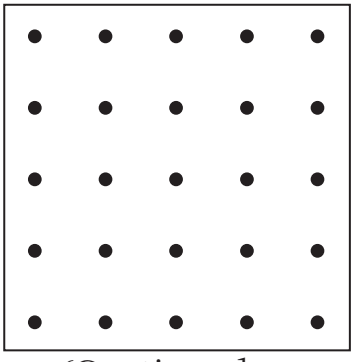












(Continued on next page.)

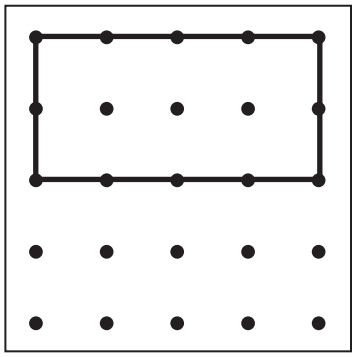
NAME _____ **DATE** _____

Dividing a Rectangle page 2 of 2

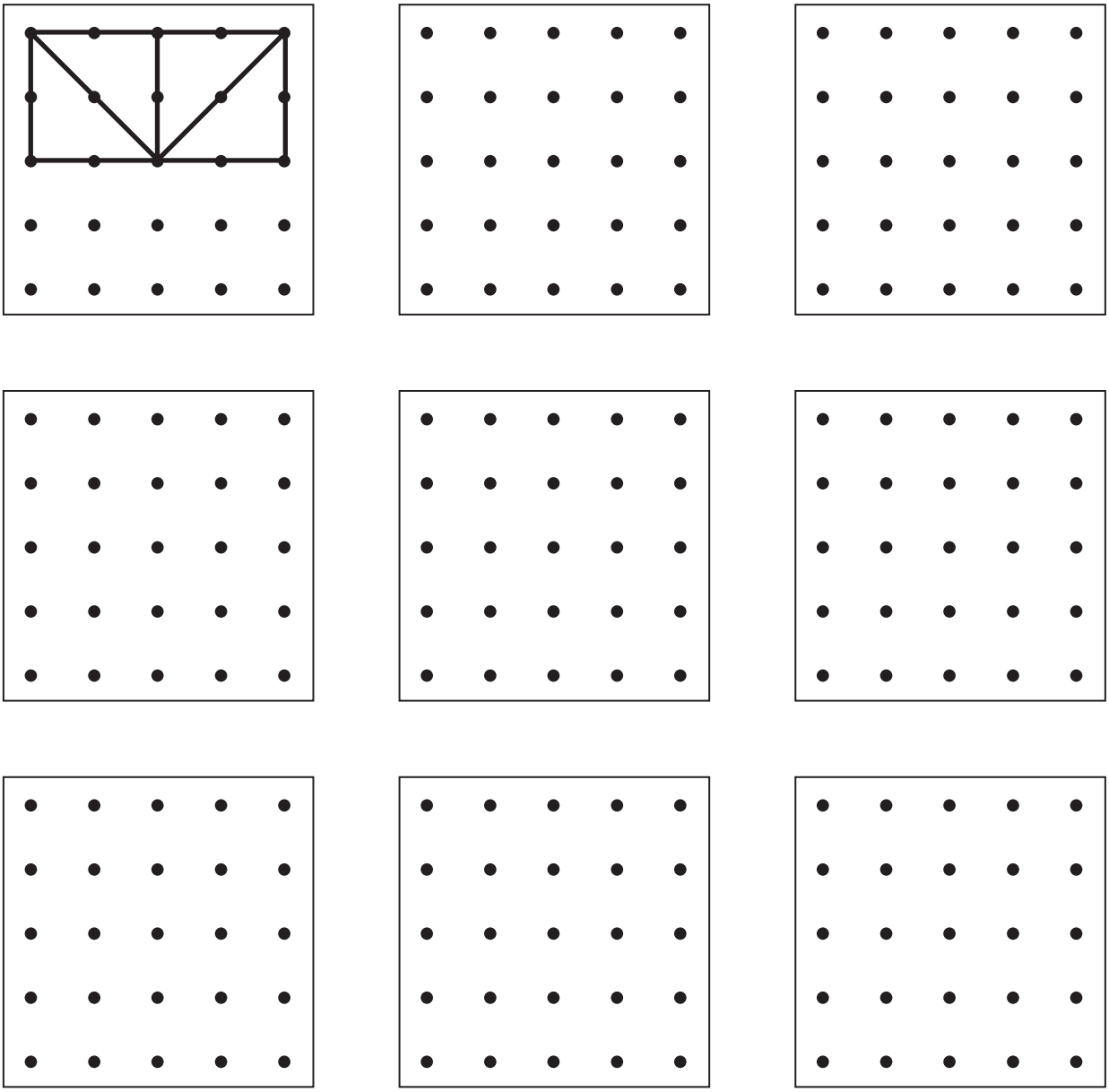
1 Make the rectangle at right on your geoboard.

2 Using other geobands, divide the rectangle into four congruent shapes.

3 Record the different ways you can divide this rectangle into four congruent shapes. One possibility is shown below.



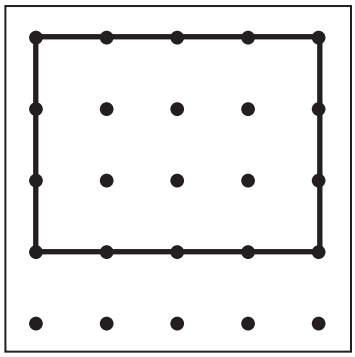
example:



NAME _____ **DATE** _____

Area of a Rectangle page 1 of 2

1 If each small square on this geoboard has an area of 1 square unit, what is the area of the rectangle?



a Use numbers, words, and/or labeled sketches to show how you got your answer.

b The area of the rectangle is _____ square units.

2 A rectangle is 2 tile wide and 8 tile long. If each tile has an area of 1 square unit, what is the area of this rectangle?

a Use numbers, words, and/or labeled sketches to show how you got your answer.

b The area of the rectangle is _____ square units.

3 What is the area of a rectangle that is 3 inches wide and 6 inches long?

a Use numbers, words, and/or labeled sketches to show how you got your answer.

b The area of the rectangle is _____ square inches.

(Continued on back.)

NAME _____ **DATE** _____

Area of a Rectangle page 2 of 2

4 What is the area of a rectangle that is $2\frac{1}{2}$ inches wide and 6 inches long?

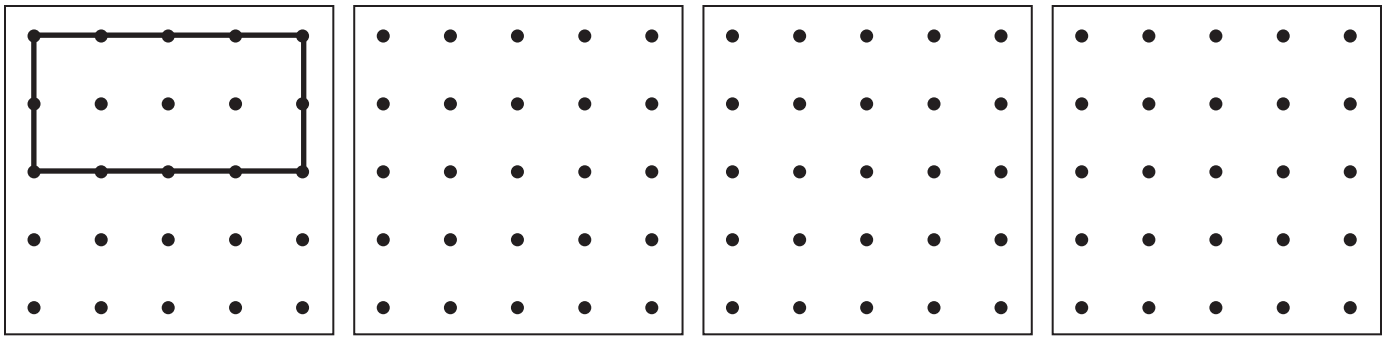
a Use numbers, words, and/or labeled sketches to show how you got your answer.

b The area of the rectangle is _____ square inches.

CHALLENGE

5 Get a geoboard and some geobands. Make some polygons* that have an area of exactly 8 square units and record each of them below. Your polygons don't have to be rectangles.

example:

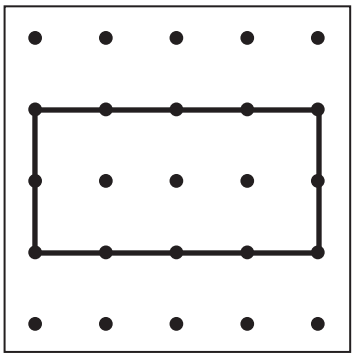


* A polygon is a closed 2-dimensional figure made up of 3 or more line segments. Triangles, squares, rectangles, and pentagons are all examples of polygons.

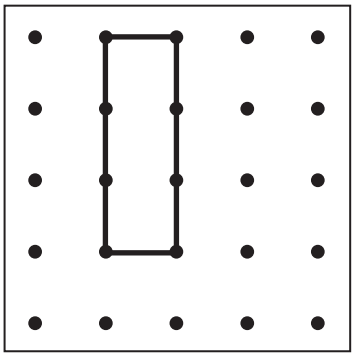
NAME _____ **DATE** _____

Area of Figures page 1 of 3

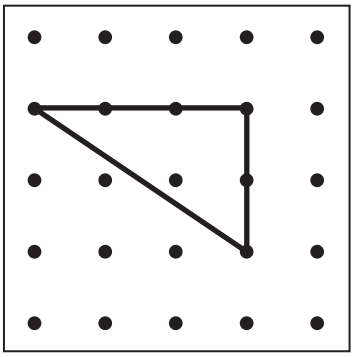
1 Find and record the area of each figure below. Each small square on the geoboard has an area of 1 square unit.



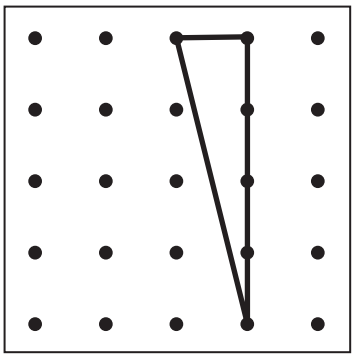
a _____ square units



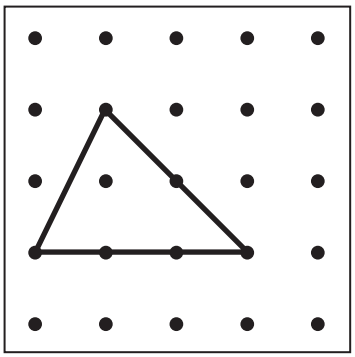
b _____ square units



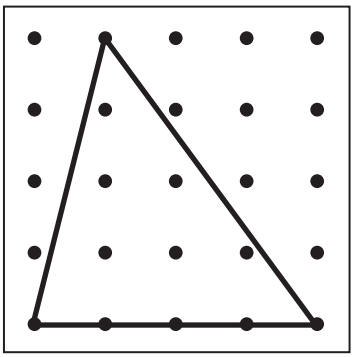
c _____ square units



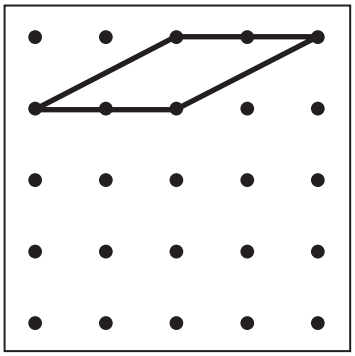
d _____ square units



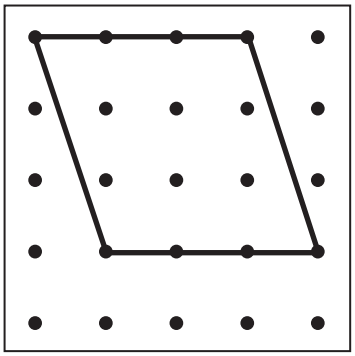
e _____ square units



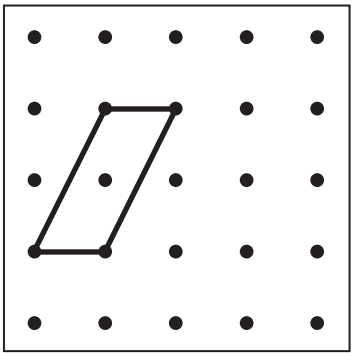
f _____ square units



g _____ square units



h _____ square units



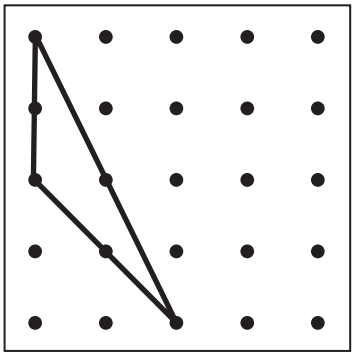
i _____ square units

(Continued on back.)

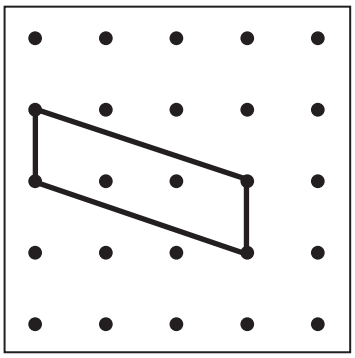
NAME _____ **DATE** _____

Area of Figures page 2 of 3

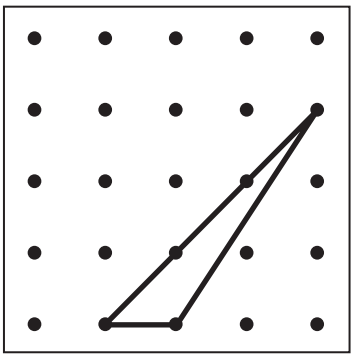
CHALLENGE



j square units _____

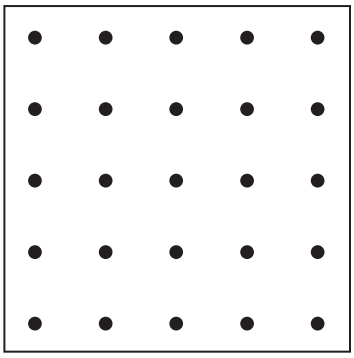


k square units _____



l square units _____

2a Copy one of the right triangles from page 59 onto the geoboard at the right.



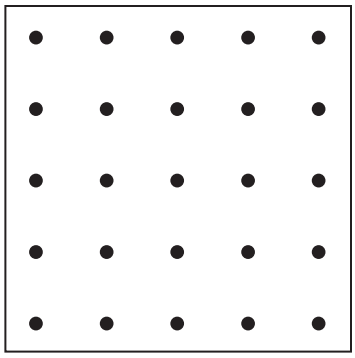
b Explain how you determined the triangle's area. Write the explanation below and use the geoboard at the right to make a labeled sketch.

(Continued on next page.)

NAME _____ **DATE** _____

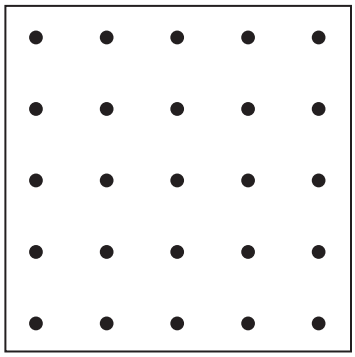
Area of Figures page 3 of 3

3a Copy one of the other triangles from page 59 onto the geoboard at the right.



b Explain how you determined the triangle's area. Write the explanation below and use the geoboard at the right to make a labeled sketch.

4a Copy one of the parallelograms (that is not a rectangle) from page 59 onto the geoboard at the right.



b Explain how you determined the parallelogram's area. Write the explanation below and use the geoboard at the right to make a labeled sketch.

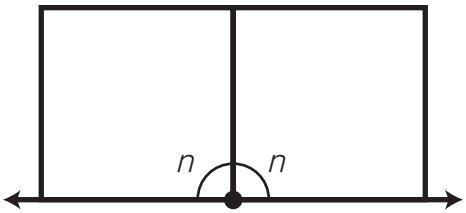
NAME _____ **DATE** _____

Pattern Blocks & Angle Measure page 1 of 2

A straight angle measures 180 degrees.

180 degrees

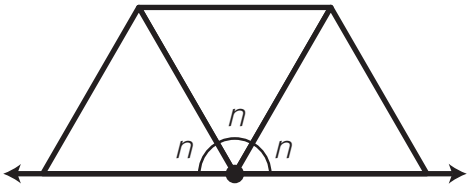
1a Place 2 square pattern blocks together as shown below.



b Determine the value of each angle marked n. Show your work below, using sketches, numbers, and words.

c The value of each angle marked n is _____ degrees.

2a Place 3 triangle pattern blocks together as shown below.



b Determine the value of each angle marked n. Show your work below, using sketches, numbers, and words.

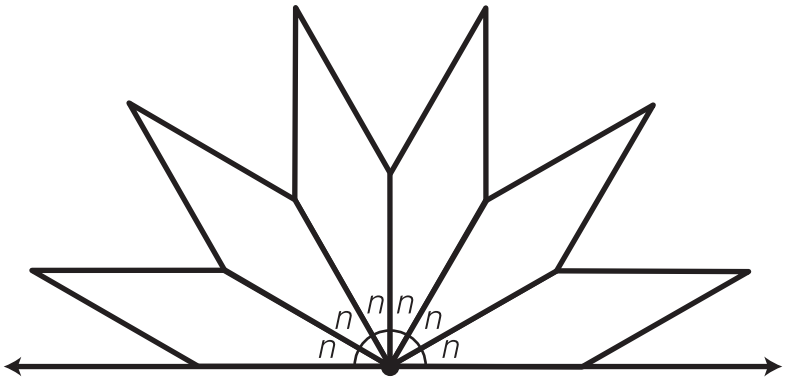
c The value of each angle marked n is _____ degrees.

(Continued on back.)

NAME _____ **DATE** _____

Pattern Blocks & Angle Measure page 2 of 2

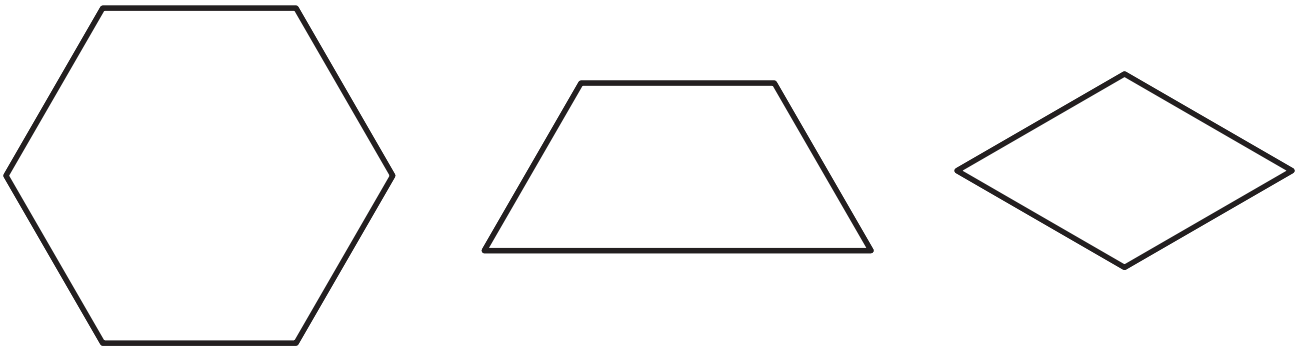
3a Place 6 white rhombus pattern blocks together as shown below.



b Determine the value of each angle marked n. Show your work below, using sketches, numbers, and words.

c The value of each angle marked n is _____ degrees.

4a Determine and label the angle measures of the other three pattern blocks in the set.



b Circle one of the shapes above and use words, numbers, and labeled sketches to explain how you figured out the measure of each angle in that shape.

NAME _____ **DATE** _____

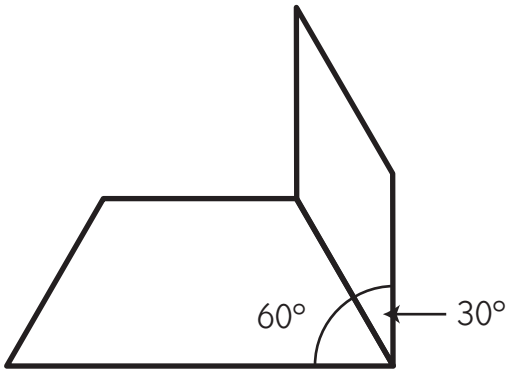
Pattern Block Angle Puzzles page 1 of 2

CHALLENGE

If possible, put 2 different (noncongruent) pattern blocks together to make the angles listed below. For each one, trace around the pattern blocks to make a labeled sketch of your solution. If you can find more than one way to make the angle, show it.

1 right angle (90°)

sample solution



60° + 30° = 90°

your solution

2 an obtuse angle (greater than 90° and less than 180°)

first solution

second solution

(Continued on back.)

NAME _____ **DATE** _____

Pattern Block Angle Puzzles page 2 of 2

CHALLENGE

3 a straight angle (180°)

first solution

second solution

4 a reflex angle (greater than 180°)

first solution

second solution

5 Mai says it's impossible to put 2 different pattern blocks together to make an acute angle (an angle less than 90°). Do you agree or disagree with her? Explain your answer.

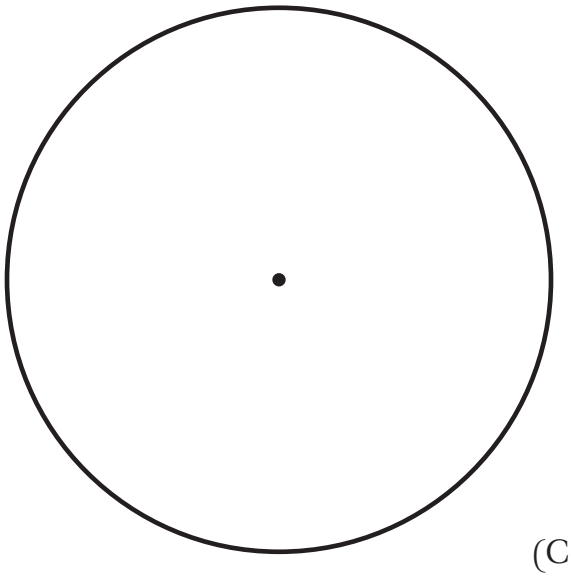
NAME _____ **DATE** _____

Sir Cumference & Circles page 1 of 2

Fill in the table below for these mathematical terms related to circles.

Term	Write a definition of the term	Which character's name in *Sir Cumference and the Great Knight of Angleland* is based on the term? The names are listed below.	Picture
1 radius	**a**	**b**	**c** Draw and label two examples of a radius on the circle below.
2 diameter	**a**	**b**	**c** Draw and label two examples of a diameter on the circle below.
3 circumference	**a**	**b**	**c** Draw and label an arrow pointing to the circumference of the circle below.

Squire Radius Sir Cumference Lady Di of Ameter

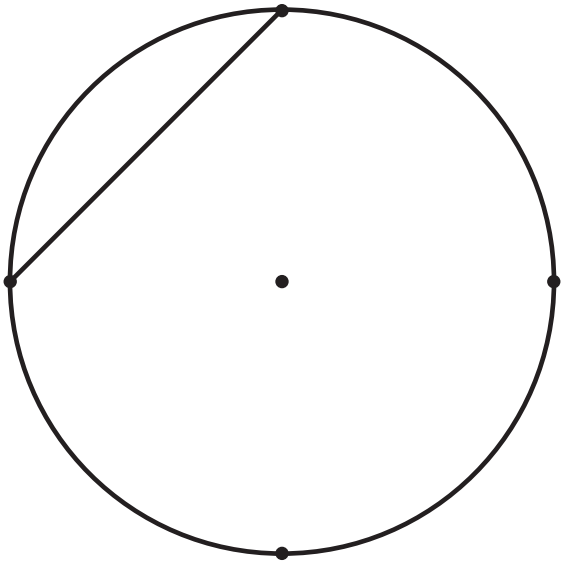


(Continued on next page.)

NAME _____ **DATE** _____

Sir Cumference & Circles page 2 of 2

4a Draw straight lines to connect the 4 points on the circle below. The first two have been connected for you. Connect the rest of the points in the same manner. The points are all spaced equally around the circle.



b What shape did you just draw inside the circle?

5 Use labeled sketches, numbers, and/or words to convince someone else that you have identified the shape correctly in part b above.

NAME _____ **DATE** _____

Experimenting with Angle Measurement page 1 of 2

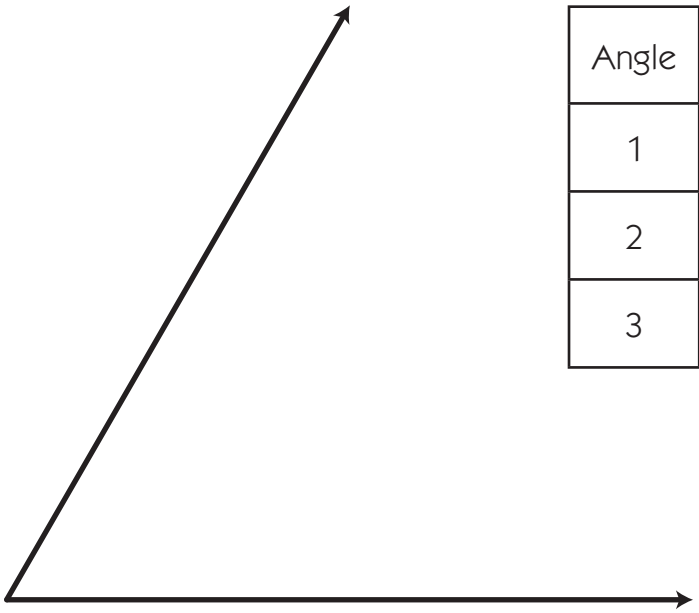
1 For each angle below:

a Estimate how many degrees you think it measures.

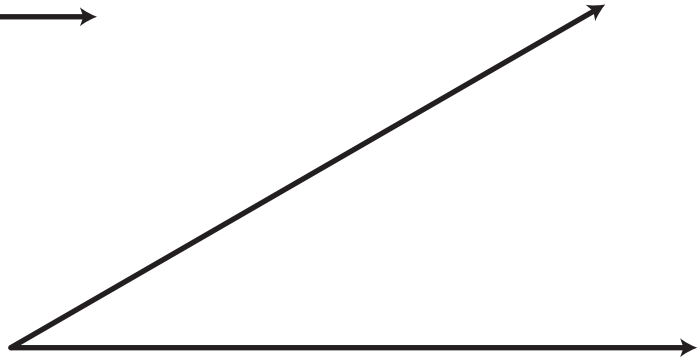
b Use a pattern block to check the measure. (Each angle below matches one or more of the angles in your pattern blocks.)

c Measure it with your protractor.

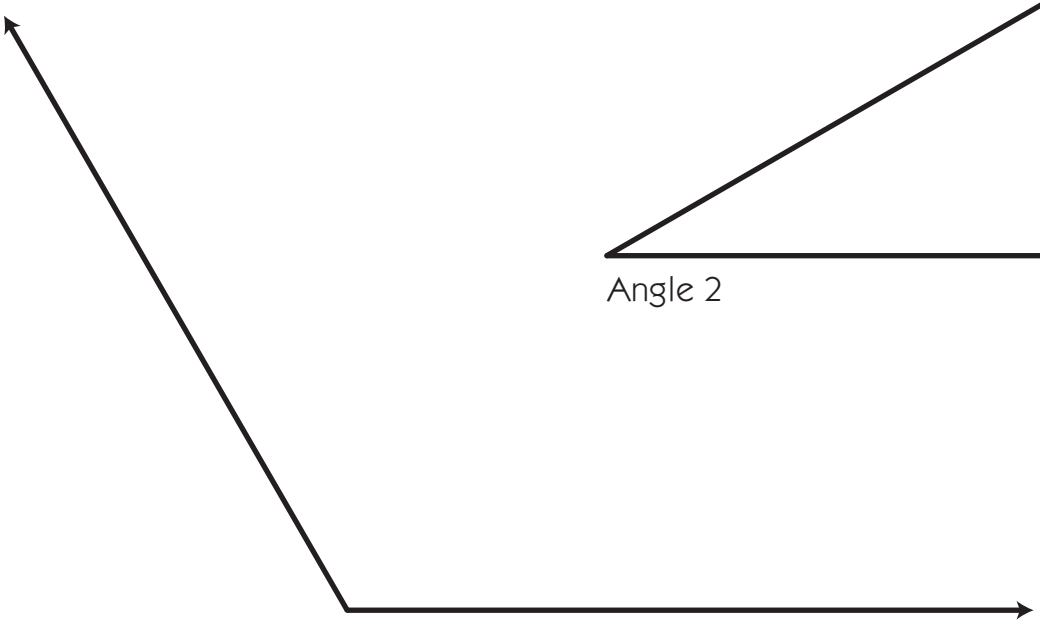
Angle	How many degrees? (estimate)	How many degrees? (actual measure)
1		
2		
3		



Angle 1



Angle 2



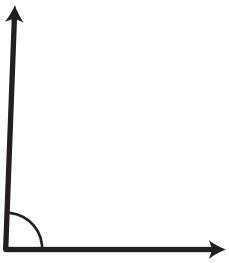
Angle 3

(Continued on back.)

NAME _____ **DATE** _____

Experimenting with Angle Measurement page 2 of 2

2 Lan says the angle below measures about 120°. Do you agree or disagree with her? Explain your answer.



3 Using a protractor, construct a 60° angle below or on a separate piece of paper. (If you use another sheet of paper, attach it to this assignment.) Check your work with a pattern block, and include the pattern block in your angle sketch.

CHALLENGE

4 Look around your classroom for acute angles. Choose several. For each angle you choose:

a Estimate how many degrees you think it measures.

b Measure it with your protractor.

c Record your work on the chart below.

Acute Angles in the Classroom	How many degrees?	How many degrees?

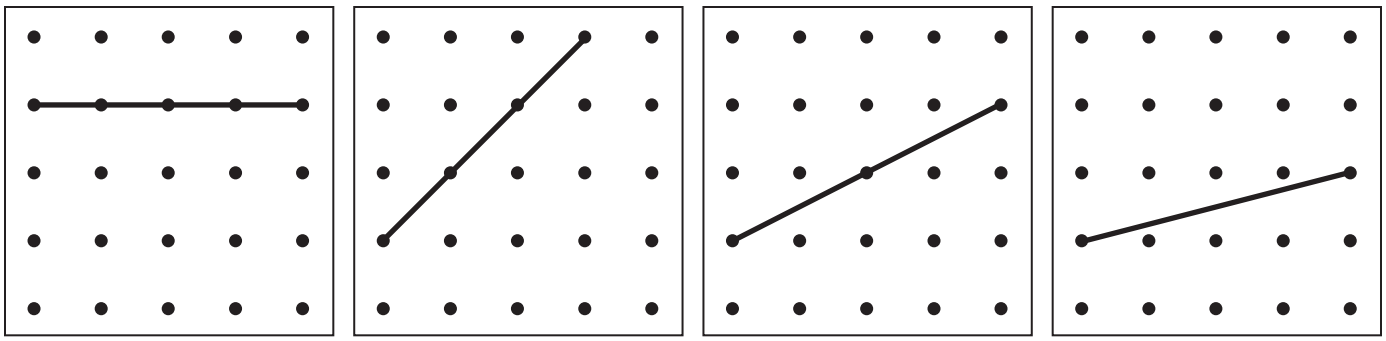
NAME _____ **DATE** _____

Parallels, Perpendiculars & Angles page 1 of 3

1 On each geoboard below:

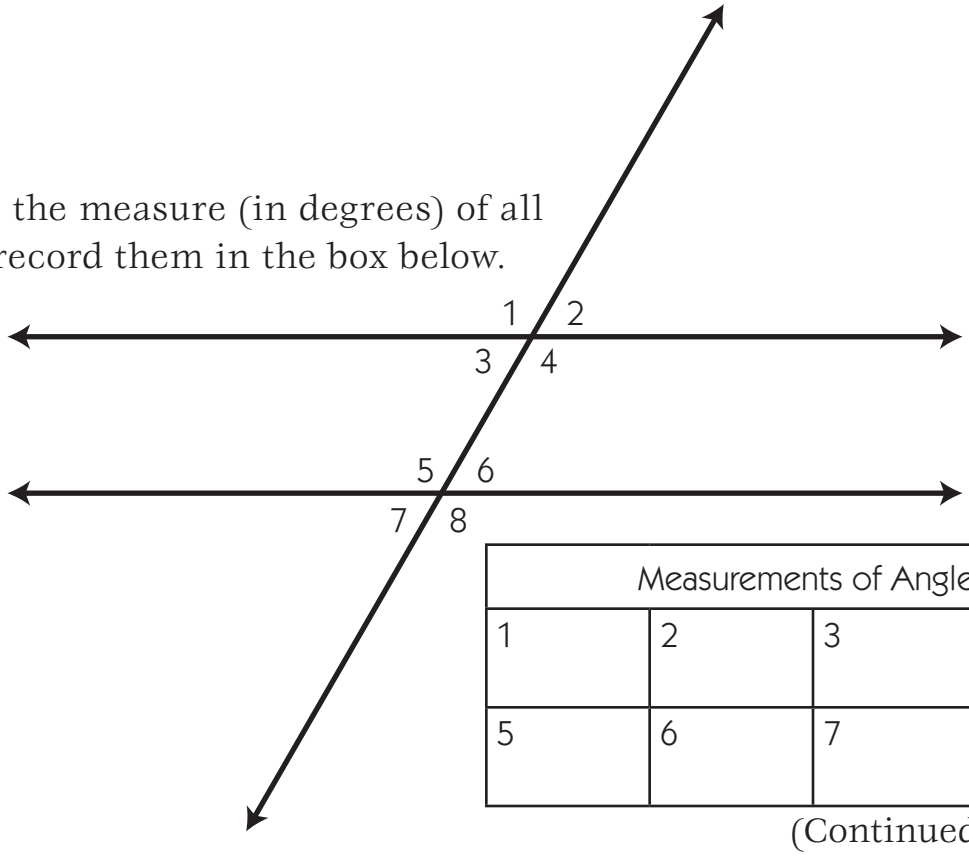
a Draw a line parallel to the line shown.

b Draw a line perpendicular to the line shown.



2 The parallel lines in the drawing below are intersected by a third line, forming 8 angles. Write at least 3 observations, predictions, or estimates about these angles.

3 Determine the measure (in degrees) of all 8 angles and record them in the box below.



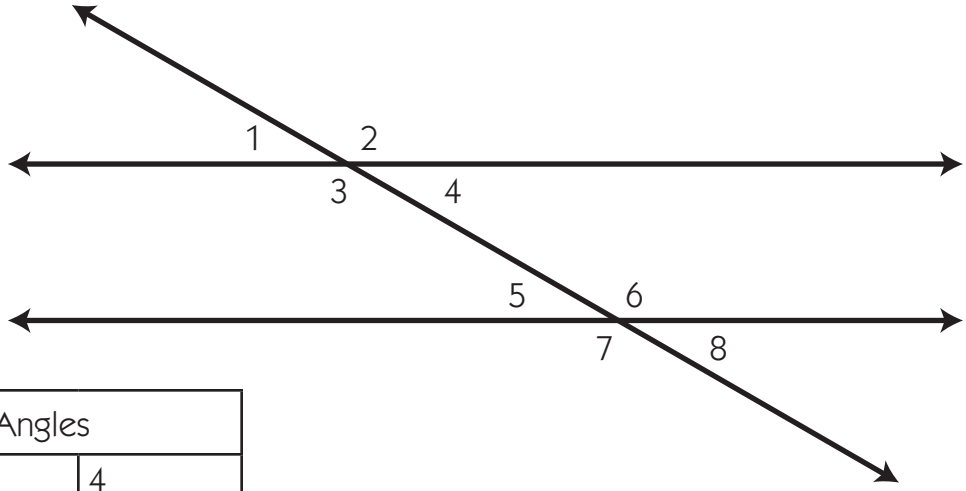
Measurements of Angles			
1	2	3	4
5	6	7	8

(Continued on back.)

NAME _____ **DATE** _____

Parallels, Perpendiculars & Angles page 2 of 3

4 Determine the measures of all 8 angles in this drawing and record them in the box below. The horizontal lines are parallel.

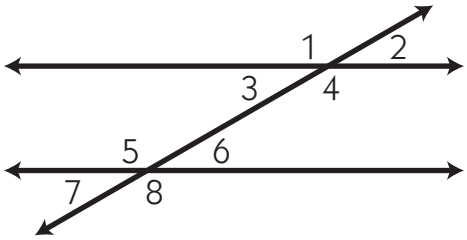


Measurements of Angles			
1	2	3	4
5	6	7	8

5 In the figure below, 8 angles are formed. The horizontal lines are parallel.

a Which angles have the same measure as angle number 1?

b Use labeled sketches, numbers, and words to explain your answer.



(Continued on next page.)

NAME _____ **DATE** _____

Parallels, Perpendiculars & Angles page 3 of 3

CHALLENGE

6 Suppose line m is parallel to line n and line m is perpendicular to line p. Make a sketch of the situation and use it to answer the question below.

Which of the following is true?

○ line n is parallel to line p

○ line n is perpendicular to line p

7 Suppose line m is perpendicular to line n and line m is perpendicular to line p. Make a sketch of the situation and use it to answer the question below.

Which of the following is true?

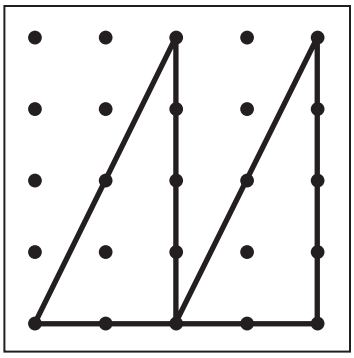
○ line n is parallel to line p

○ line n is perpendicular to line p

NAME _____ **DATE** _____

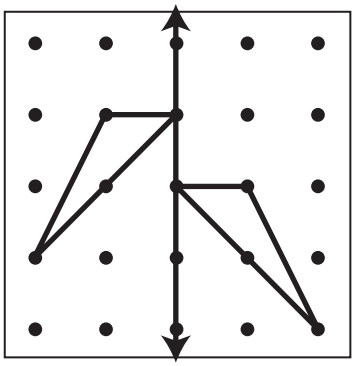
Congruent Triangles

1 Use labeled sketches, numbers, and words to explain why the two triangles at right are congruent.



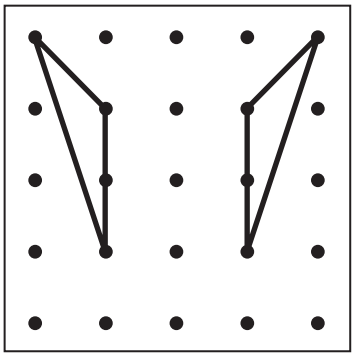
2 Below are six pairs of congruent triangles. For each pair, describe how to map the left figure onto the right figure using reflections, rotations, and/or translations. If you use a reflection, draw in the reflecting line. If you use a translation or rotation, describe it. The first pair is done for you as an example.

a

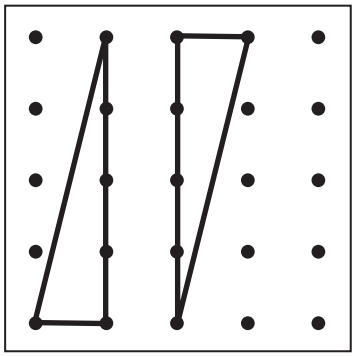


reflection and then translate down 1 unit

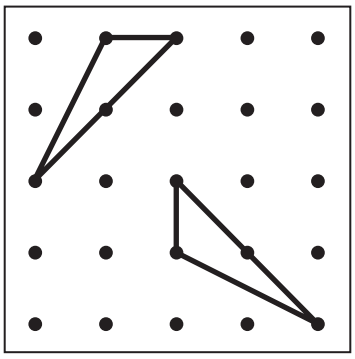
b



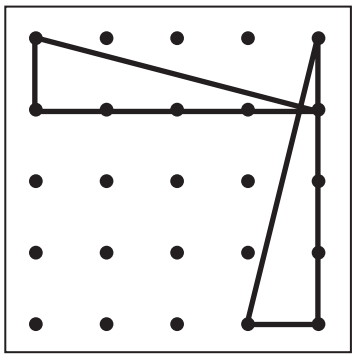
c



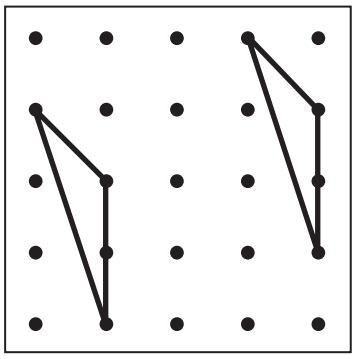
d



e



f



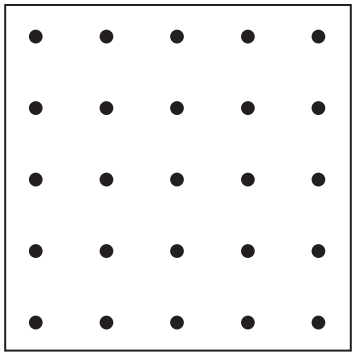
NAME _____ **DATE** _____

Symmetry of Figures page 1 of 3

For each shape on this page and the next:

- Draw an example of the figure on the geoboard.
- Determine the number of lines of symmetry.
- Draw in the lines of symmetry.
- Find the order of rotation. (When you give the shape a complete 360º turn, how many times does it look exactly as it did when you started?)

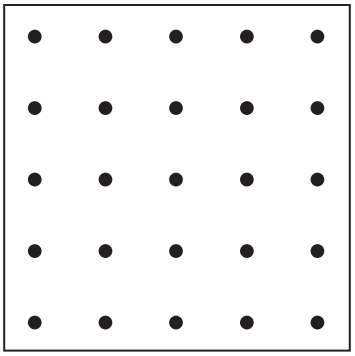
Note One of the eight shapes is impossible to construct on a geoboard. Can you figure out which one it is?



1 Isosceles Triangle

number of lines of symmetry _____

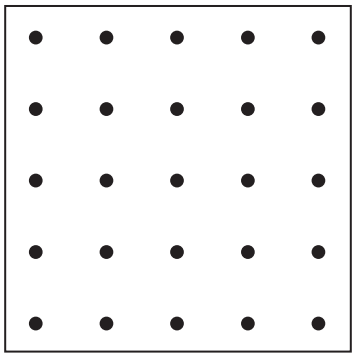
order of rotation _____



2 Scalene Triangle

number of lines of symmetry _____

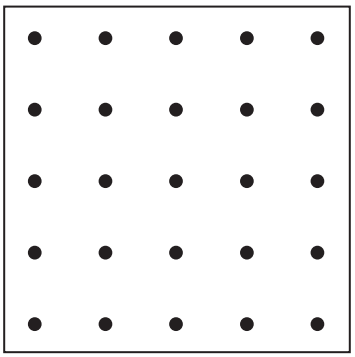
order of rotation _____



3 Equilateral Triangle

number of lines of symmetry _____

order of rotation _____



4 Square

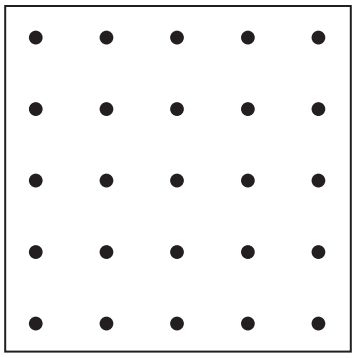
number of lines of symmetry _____

order of rotation _____

(Continued on back.)

NAME _____ **DATE** _____

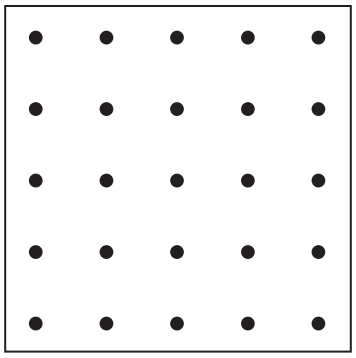
Symmetry of Figures page 2 of 3



5 Isosceles Trapezoid

number of lines of symmetry _____

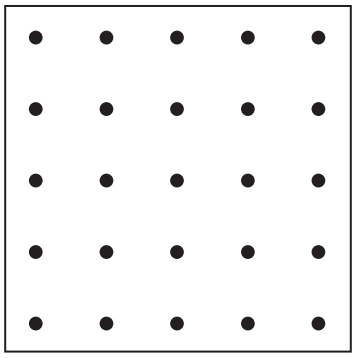
order of rotation _____



6 Parallelogram (*not* a square, rectangle, or rhombus)

number of lines of symmetry _____

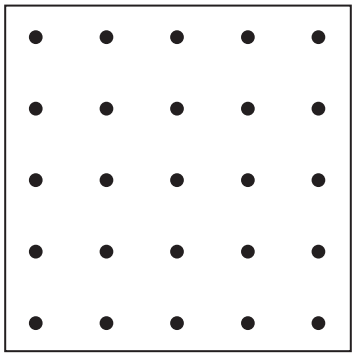
order of rotation _____



7 Rectangle (*not* a square)

number of lines of symmetry _____

order of rotation _____



8 Rhombus (*not* a square)

number of lines of symmetry _____

order of rotation _____

(Continued on back.)

NAME _____ **DATE** _____

Symmetry of Figures page 3 of 3

CHALLENGE

9 Construct the figures described below on a geoboard and then draw them on a piece of Geoboard Recording Paper. Be sure to label each figure on your paper.

a This figure is not a square, but it has order of rotation 4.

b This figure is not a parallelogram. Its area is 12 square units. It has order of rotation 2.

c This figure is a hexagon. It does not have reflective symmetry. Its area is $4\frac{1}{2}$ square units.

d This figure has reflective symmetry across a vertical (↕) line and a horizontal (↔) line. (Draw the lines of reflection on your figure.)

NAME _____ **DATE** _____

Naming Polygons

Naming Polygons

A polygon is a closed 2-dimensional figure made up of 3 or more line segments. The name of a polygon depends on how many sides it has.

Triangle
3 sides

Quadrilateral
4 sides

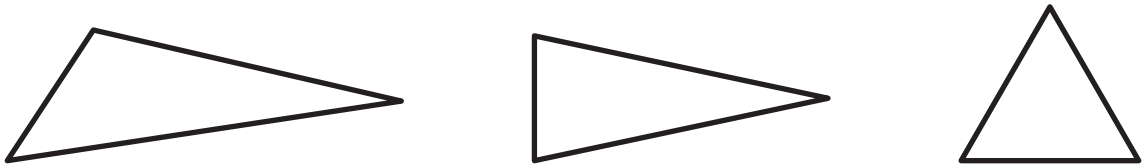
Pentagon
5 sides

Hexagon
6 sides

Octagon
8 sides

Naming Triangles

You can name a triangle by looking at its side lengths.



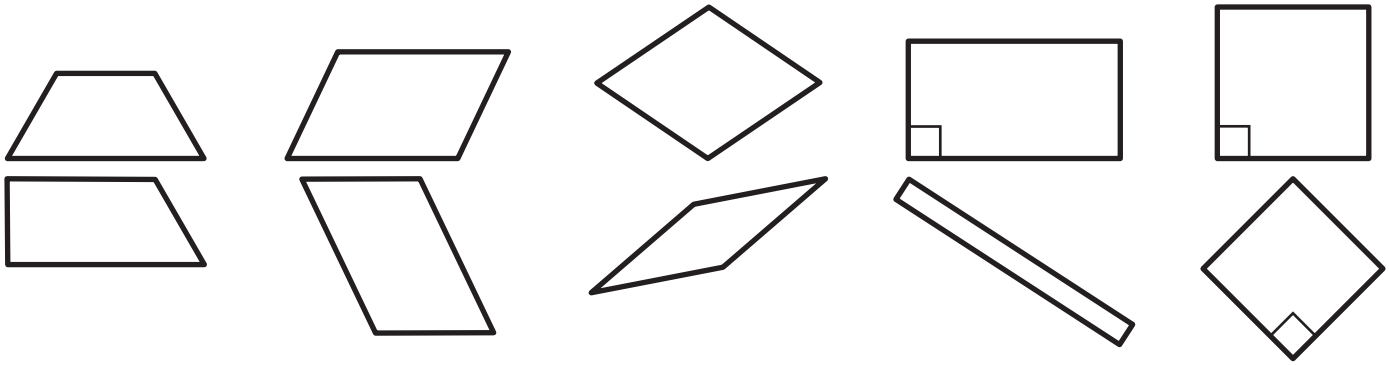
Scalene Triangle
Each side is a different length.

Isosceles Triangle
two sides are the same length.

Equilateral Triangle
All three sides are the same length.

Naming Quadrilaterals

Any polygon with 4 sides is a quadrilateral, but some quadrilaterals have more than one name.



Trapezoid
a quadrilaterial with 1 pair of parallel sides

Parallelogram
a quadrilateral with 2 pairs of parallel sides the same length

Rhombus
a parallelogram with all 4 sides the same length

Rectangle
a parallelogram with 4 right angles

Square
a rectangle with all 4 sides the same length

NAME _____ **DATE** _____

Instructions for Drawing Stars

Instructions for Drawing 5-Point Stars

1 Get a copy of the Template for a 5-Point Star. You'll also need a pencil, a protractor, and a ruler.

2 From radius OA, create a 72º angle.

3 Mark the point where the angle intersects the circle as point B. Use your ruler to draw a straight line from point O to point B.

4 Using OB as a new starting line, create another 72º angle. Mark the point where it intersects the circle as point C. Use your ruler to draw a line from point O to point C.

5 Continue in this way until you have marked points A, B, C, D, and E, and drawn line segments OA, OB, OC, OD, and OE.

6 Use a ruler to make your lines straight. Connect A to C, then C to E, then E to B, then B to D, and then D to A.

7 When and if you have time, decorate the star in any way you like.

CHALLENGE

Instructions for Drawing 9-Point Stars

1 Get a copy of the Template for a 9-Point Star. You'll also need a pencil, a protractor, and a ruler.

2 Create 9 equally spaced points along the circle: A, B, C, D, E, F, G, H and I. (Hint: Think about the 72 degree angles in your 5-point star and where they came from.)

3 Using your ruler, connect the points to form triangles ADG, BEH, and CFI.

4 When and if you have time, decorate the star in any way you like.

NAME _____ **DATE** _____

From 32 to 68 page 1 of 3

CHALLENGE

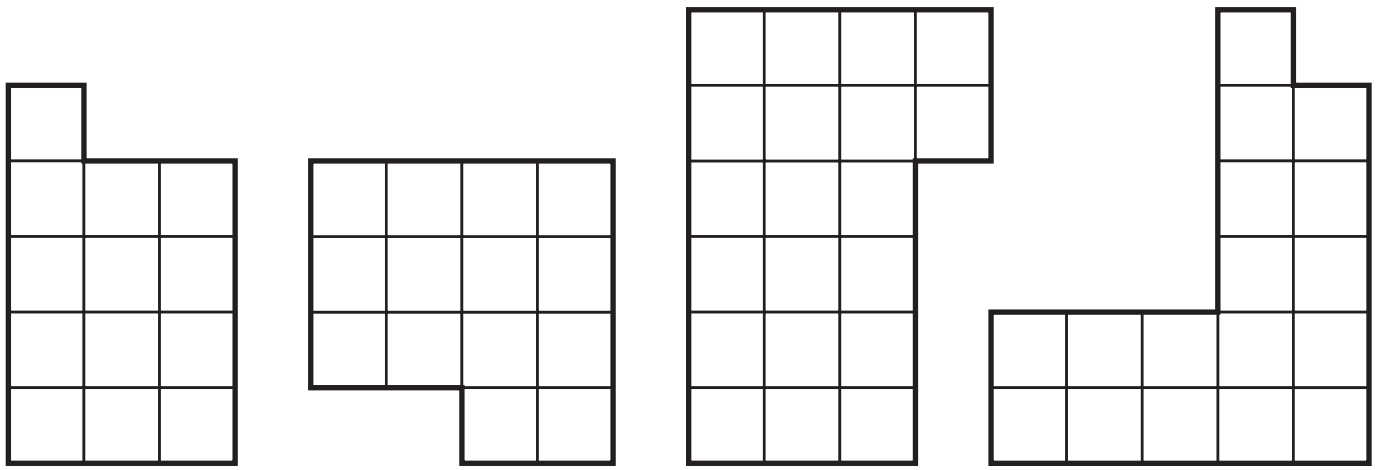
1a Cut out the four figures below. Fit them together to create a square that has a total perimeter of 32 centimeters. Then trace the pieces the way they fit together on the centimeter grid on pages 85 and 86.

b What is the area of the square?

2 Can you create a figure with all four pieces that has a smaller perimeter than the square you just built (but that still has the same area)? If so, trace it on the centimeter grid, calculate its perimeter and record the perimeter next to the tracing. If you can't, explain why you think you can't.

3a Now arrange the same four pieces to create a figure that has a perimeter of 68 centimeters. Each side of the figure must be a whole number of centimeters, and each piece must share at least 1 full centimeter with every other piece it touches. There are a number of ways to do it. Compare your way with a friend's way. What did you do the same? What did you do differently?

b What is the area of your figure that has a perimeter of 68 centimeters?



(Continued on next page.)

NAME _____ **DATE** _____

From 32 to 68 page 2 of 3

CHALLENGE

(Continued on back.)

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From 32 to 68 page 3 of 3

CHALLENGE

This page is meant to be blank.

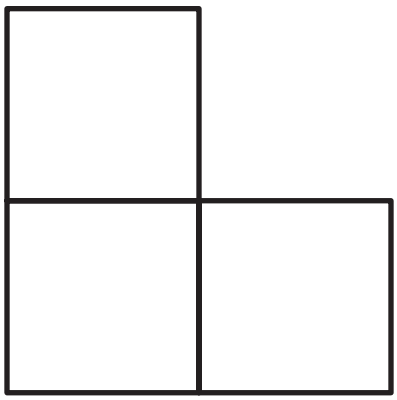
NAME _____ **DATE** _____

Similar Figures page 1 of 3

1a The next page is a piece of graph paper with a block-letter L drawn on it. On the same sheet of graph paper, construct an L with all sides *twice the length* of the given L. Construct your L so that the lower left corner is at the origin (point 0,0).

b In the space below, record at least 3 mathematical observations about the individual L's or the two L's together.

2a Use your tile to build a figure like this one, with one important difference. Make each of the sides exactly 3 times as long as they are in the figure shown here.



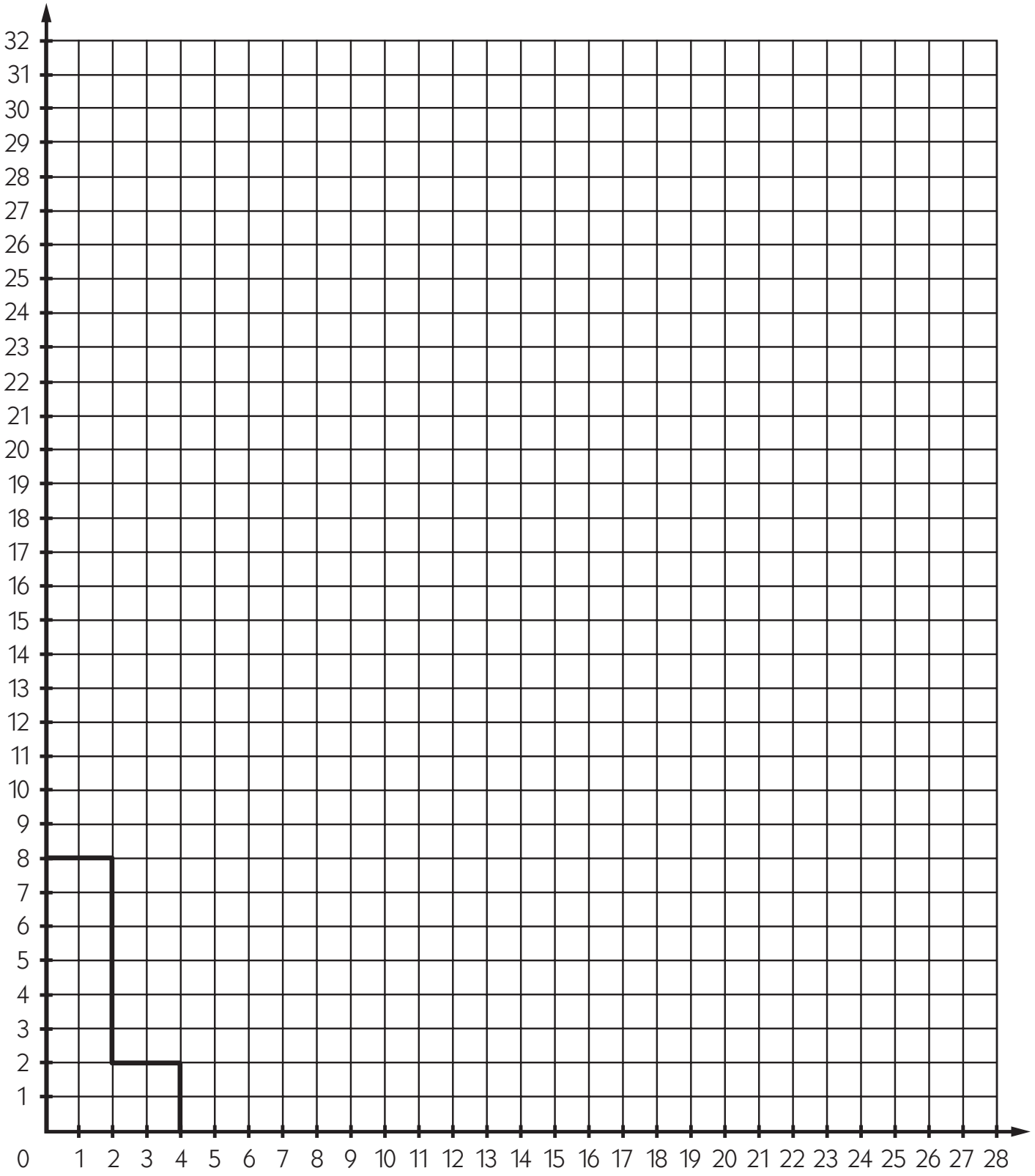
b Copy the figure you just built on square inch graph paper (page 90).

c Then on page 90, use words, labeled sketches, and numbers to describe your new figure. Be sure to show and write how many tile you used to make your new figure.

(Continued on next page.)

NAME _____ **DATE** _____

Similar Figures page 2 of 3

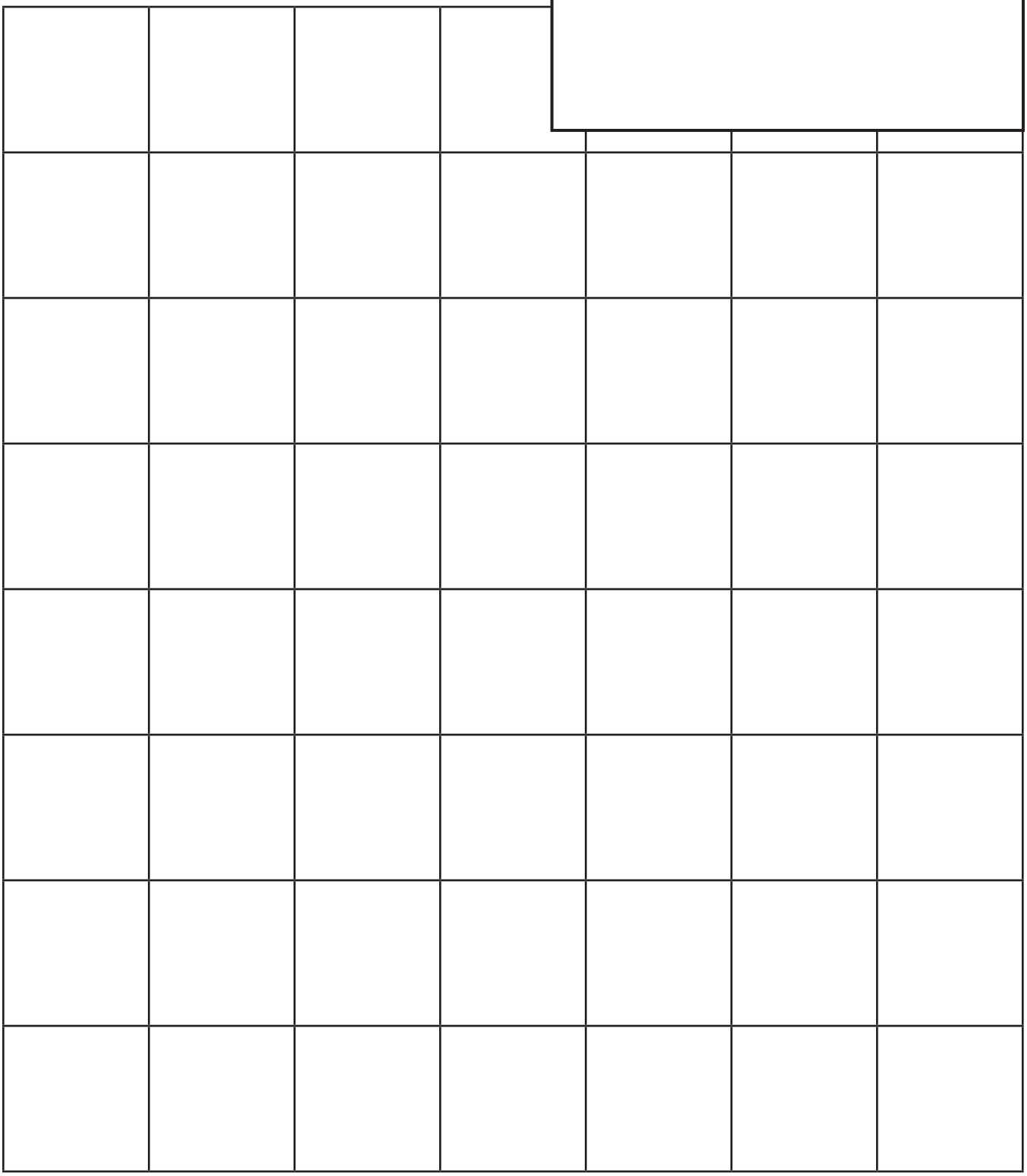


(Continued on back.)

NAME _____ **DATE** _____

Similar Figures page 3 of 3

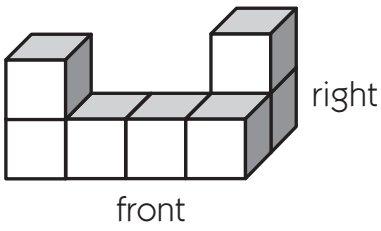
Describe your new figure:



NAME _____ **DATE** _____

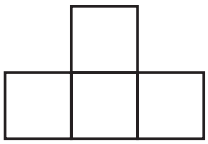
Building Views page 1 of 2

1 Use your cubes to make a copy of the building shown below. Sketch the front, right, and top views of your building in the space below.



front view right view top view

2 The pictures below show the front, right, and top views of a different building. Use your cubes to construct the building that has these views and make a labeled sketch of it below.



front view

right view

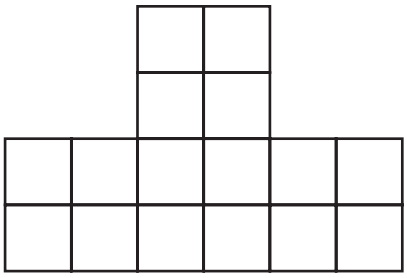
top view

(Continued on back.)

NAME _____ **DATE** _____

Building Views page 2 of 2

3 Sketch views that are *similar* to the views in problem 2, but that are twice as big. (The first one is done for you.)



front view

right view

top view

4a Use your own cubes to construct a building that has the three views shown in problem 3. You don't have to sketch it, but you do have to show it to at least one other person.

b Is the building you constructed similar to the building you built for problem 2? Use words, numbers, and/or labeled sketches to explain your answer.

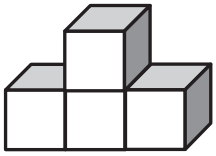
CHALLENGE

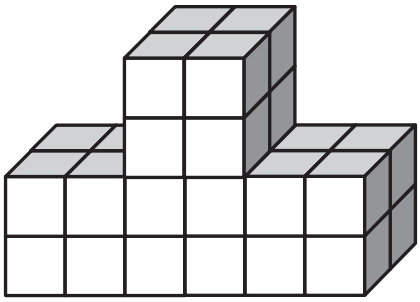
5 Can you make any other buildings that have the views from problem 3? If so, build at least one example and show it to at least one other person. Be sure to explain to that person why your second building works.

NAME _____ **DATE** _____

Cube Buildings

1a Many people made these buildings in the last session. Build both of them now with your partner.





b How are the two buildings alike? How are they different? Write at least 3 mathematical observations below.

2a Write a number in the blank to complete this statement: "The building at the right above is _____ times as big as the building at the left above."

b Explain the reason for the number you wrote in the blank.

3 Using your cubes, construct a building with all edges 3 times as long as the building on the left-hand side in problem 1. When you're finished, write a number in the blank to show how many cubes you used for this building.

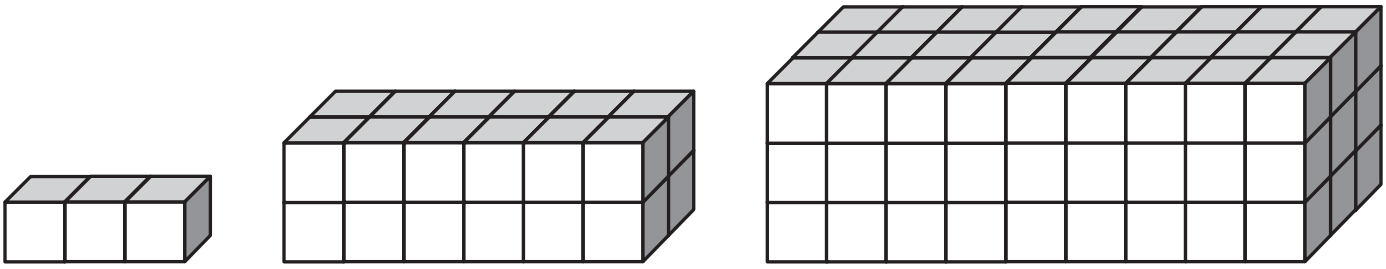
I used _____ cubes to make this building.

NAME _____ **DATE** _____

Volume

1a Use your 1-centimeter cubes to build these buildings now with your partner.

b Determine the volumes of these three buildings. How many cubes does it take to build each?



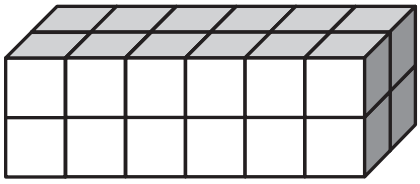
Building 1 Building 2 Building 3

The volume of building 1 is _____ cubic centimeters.

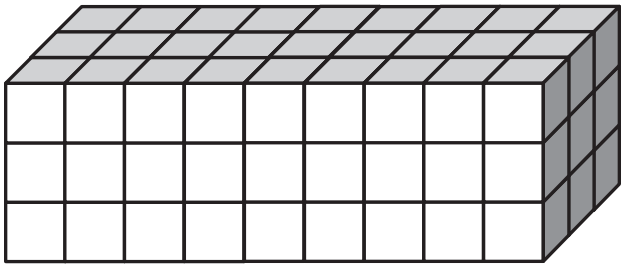
The volume of building 2 is _____ cubic centimeters.

The volume of building 3 is _____ cubic centimeters.

2 There are many different ways to figure out how many cubes are in buildings 2 and 3. Use labeled sketches, numbers, and/or words to describe a strategy for finding the volume of each building that's faster and easier than counting all the cubes 1 by 1.



Building 2



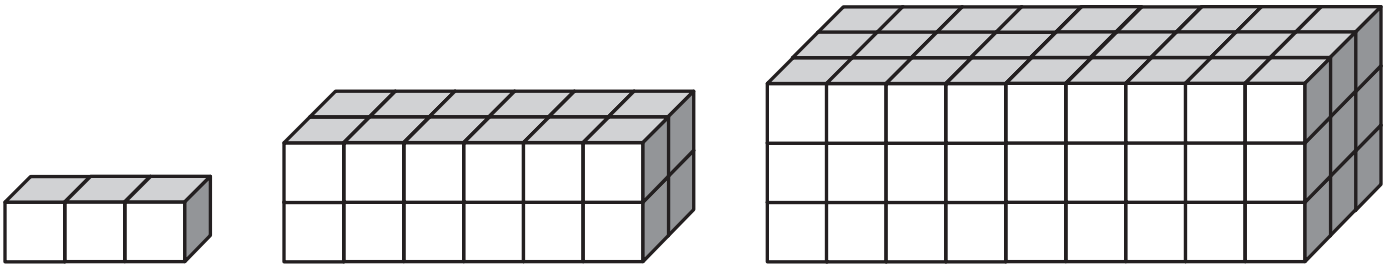
Building 3

NAME _____ **DATE** _____

Surface Area

1a Use your centimeter cubes to build these buildings with a partner.

b Determine the surface area of each building.



Building 1 Building 2 Building 3

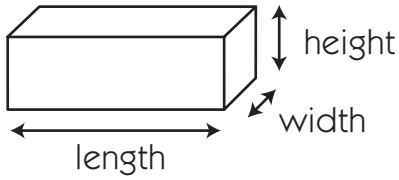
The surface area of building 1 is _____ square centimeters.

The surface area of building 2 is _____ square centimeters.

The surface area of building 3 is _____ square centimeters.

2a Use the cubes to construct a rectangular solid that is 5 centimeters long, 2 centimeters wide, and 3 centimeters high.

b Determine the surface area of this rectangular solid. Use labeled sketches, numbers, and/or words to show how you found your answers.



The surface area of the rectangular solid is _____ square centimeters.

c Determine the volume of this rectangular solid. Use labeled sketches, numbers, and/or words to show how you found your answers.

The volume of the rectangular solid is _____ cubic centimeters.

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Which Estimate Makes the Most Sense?

1 For problems a–d, fill in the bubble beside the estimate that makes the most sense and explain why you chose the estimate you did.

a 29 ÷ 4

○ 5
○ 6
○ 7
○ 8

Why?

b 57 ÷ 9

○ 6
○ 7
○ 8
○ 9

Why?

c 108 ÷ 10

○ 9
○ 10
○ 11
○ 12

Why?

d 147 ÷ 12

○ 9
○ 10
○ 11
○ 12

Why?

CHALLENGE

2 In the two boxes below, make up your own division estimation problems to share with a classmate.

a _____
(Division Problem)

○ _____
○ _____
○ _____
○ _____

Why?

b _____
(Division Problem)

○ _____
○ _____
○ _____
○ _____

Why?

Multiplication Menus page 1 of 2

1a Write the answers to the combinations in the left column. Then use the information to help solve the combinations in the right column.

1 × 15 = _____

2 × 15 = _____

10 × 15 = _____

20 × 15 = _____

3 × 15 = _____

5 × 15 = _____

30 × 15 = _____

15 × 15 = _____

b Solve the combination shown below. Explain how you got your answer.

23 × 15 = _____

2a Write the answers to the combinations in the left column. Then use the information to help solve the combinations in the right column.

1 × 24 = _____

2 × 24 = _____

10 × 24 = _____

20 × 24 = _____

3 × 24 = _____

5 × 24 = _____

30 × 24 = _____

15 × 24 = _____

b Solve the combination shown below. Explain how you got your answer.

25 × 24 = _____

NAME _____ **DATE** _____

Multiplication Menus page 2 of 2

3a Write the answers to the combinations in the left column. Then use the information to help solve the combinations in the right column.

1 × 36 = _____

2 × 36 = _____

10 × 36 = _____

20 × 36 = _____

3 × 36 = _____

5 × 36 = _____

30 × 36 = _____

15 × 36 = _____

b Solve the combination shown below. Explain how you got your answer.

40 × 36 = _____

4a Make up your own multiplication menu. You can choose any 2-, 3-, or 4-digit number *that doesn't end in a zero* to be your multiplier.

1 × _____ = _____

2 × _____ = _____

10 × _____ = _____

20 × _____ = _____

3 × _____ = _____

5 × _____ = _____

30 × _____ = _____

15 × _____ = _____

b Now make up one more combination for your multiplier that can be solved using the information on your menu. Write the combination along with the answer on the line below. Explain how you got the answer.

_____ × _____ = _____

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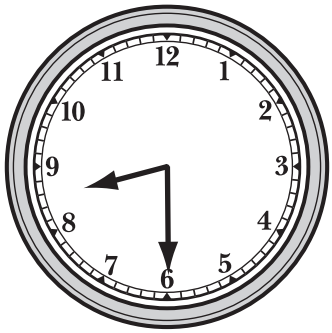
Timely Problems

CHALLENGE

Has anyone ever asked you to wait a second? Have you ever told your mom that you'll be ready for breakfast in a few seconds? Here are some problems about seconds. Use numbers, words, or labeled sketches to show how you got your answers. You can use a calculator to help.

1 How many seconds do you spend at school each day?



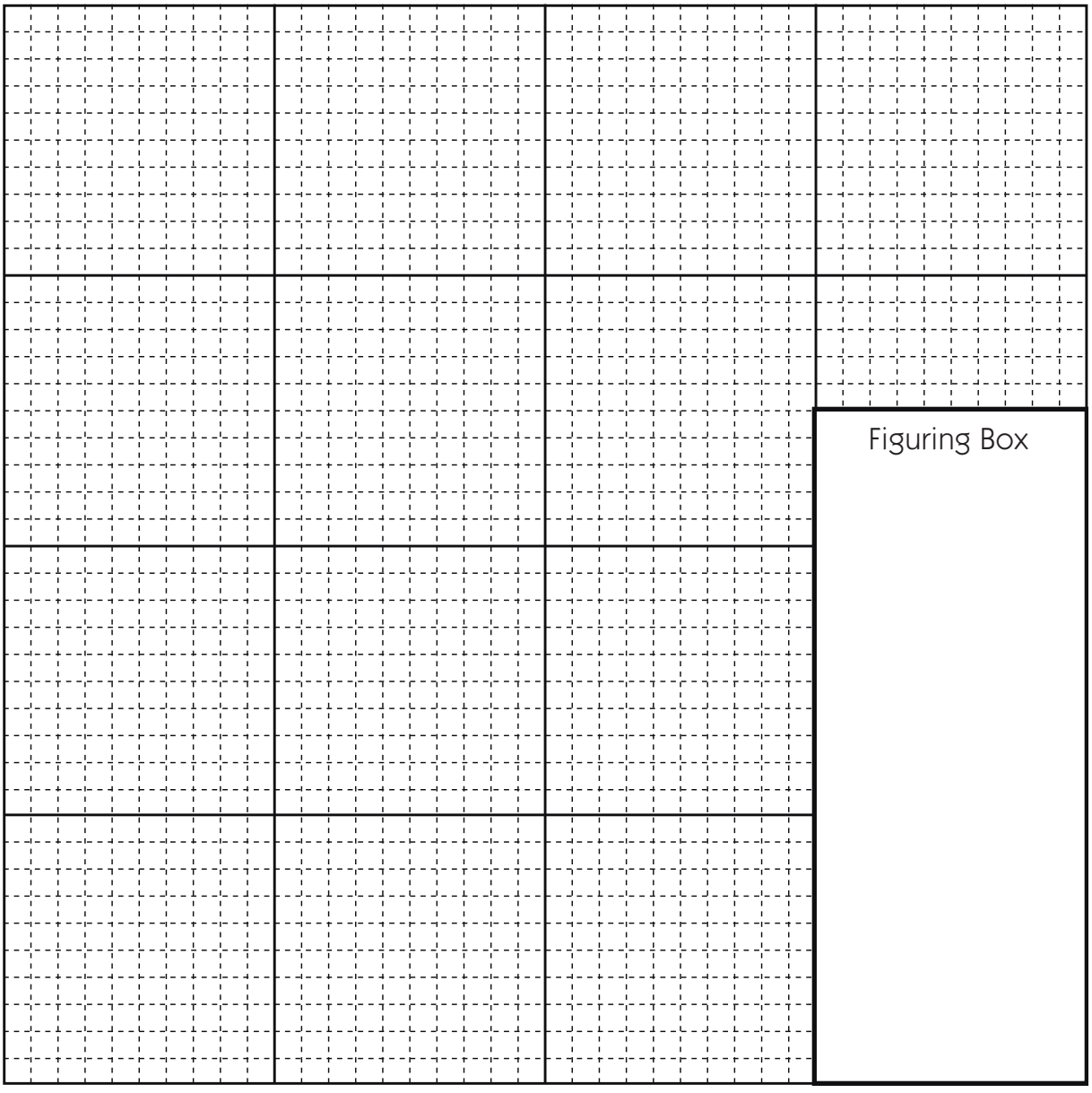
2 How many seconds do you spend at school each week?

3 Where will you be, and what do you expect to be doing one million seconds from now?

NAME _____ **DATE** _____

Story Problem Paper

Division Combination: _____	Multiplication Menu
Story Problem to Match:	
Answer: _____	



NAME _____ **DATE** _____

Roll Your Own Division Problem page 1 of 2

1 Choose one number from the board to use as a divisor. Write a menu for it on this sheet.

2 Roll 3 dice and arrange the digits to form any 3-digit number less than 560. This is your dividend.

3 Write your division problem here and use the grid to solve it.

Multiplication Menu

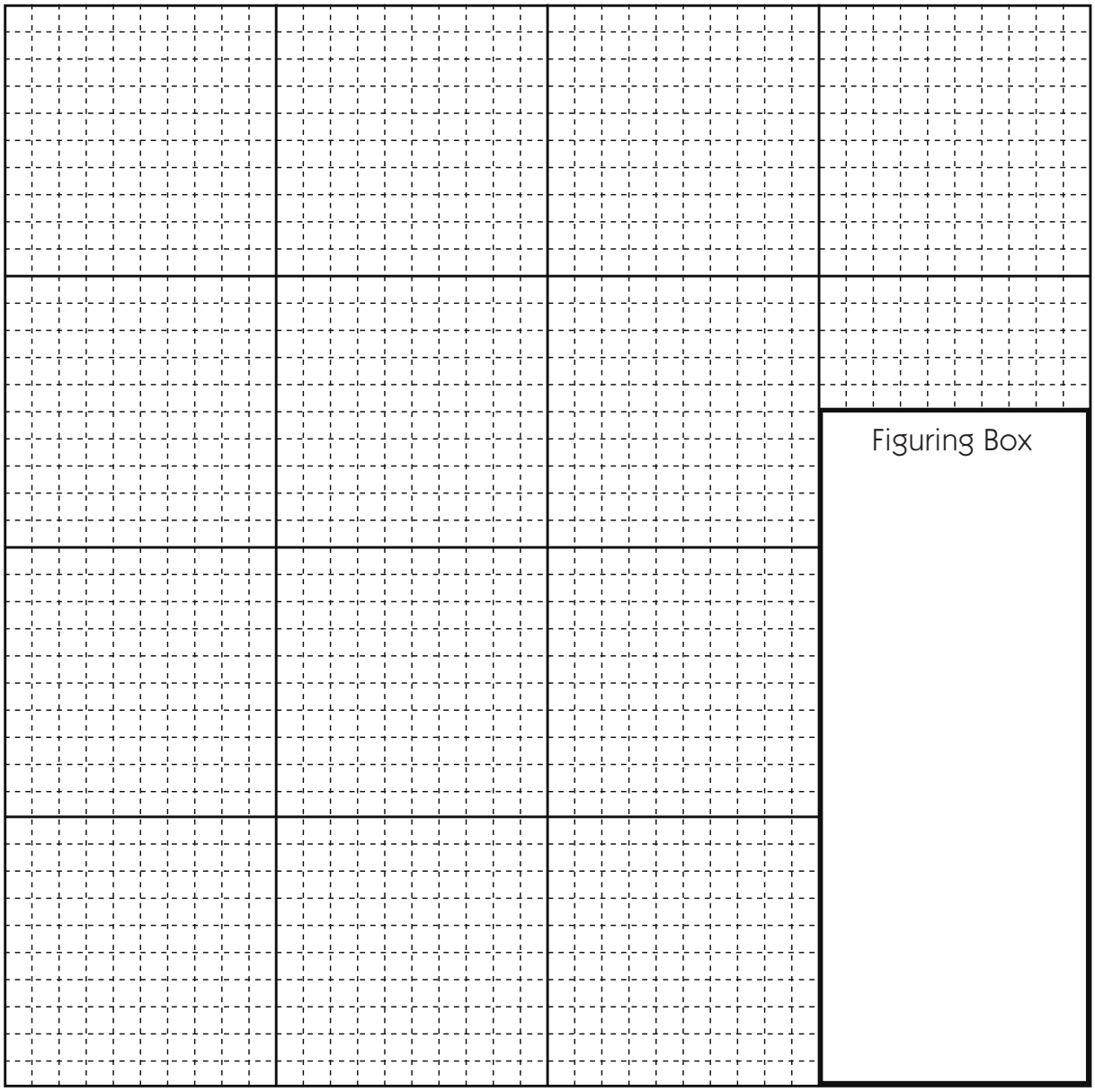
1 × _____ = _____

2 × _____ = _____

5 × _____ = _____

10 × _____ = _____

20 × _____ = _____



NAME _____ **DATE** _____

Roll Your Own Division Problem page 2 of 2

1 Choose one number from the board to use as a divisor. Write a menu for it on this sheet.

2 Roll 3 dice and arrange the digits to form any 3-digit number less than 560. This is your dividend.

3 Write your division problem here and use the grid to solve it.

Multiplication Menu

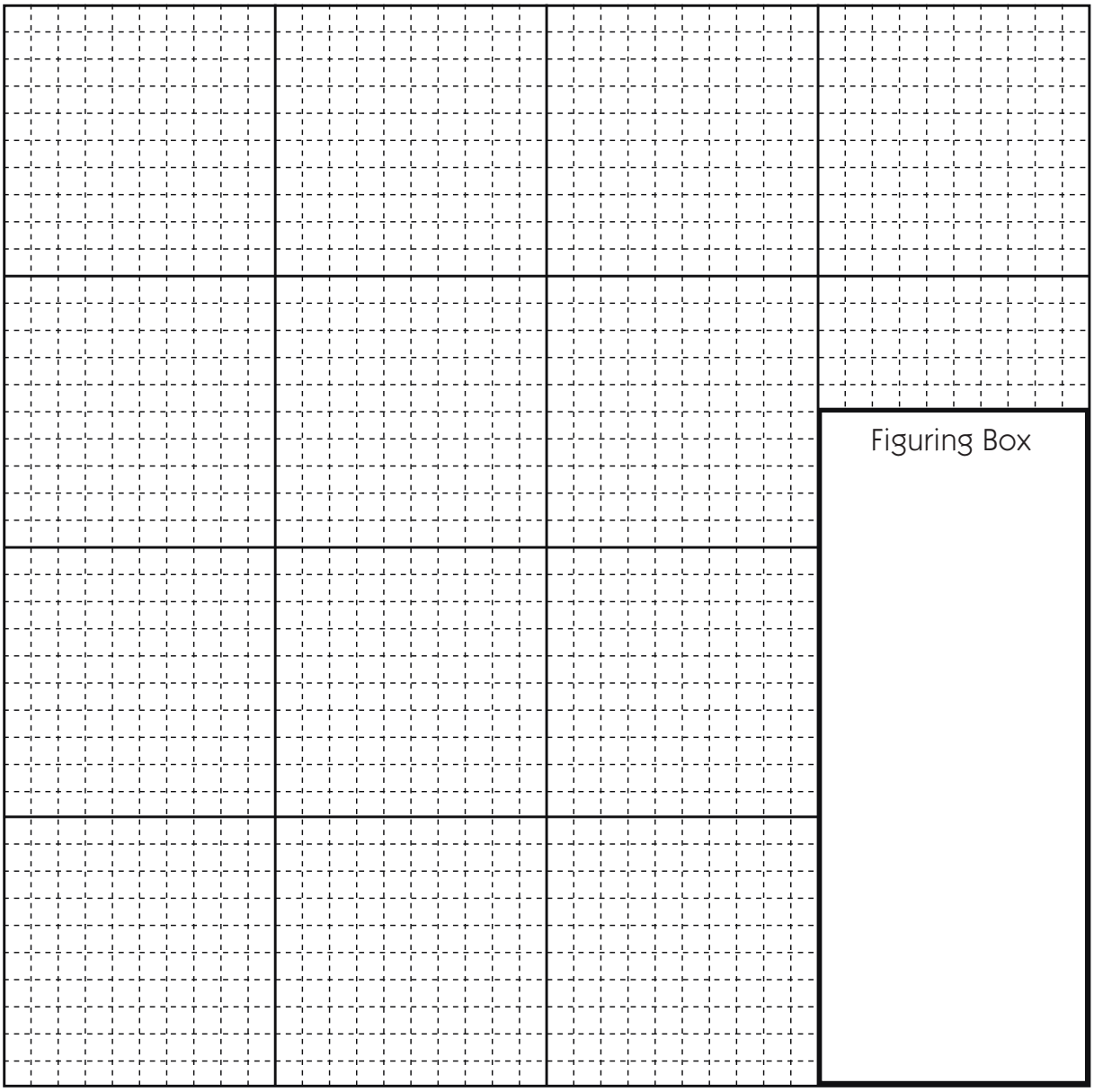
1 × _____ = _____

2 × _____ = _____

5 × _____ = _____

10 × _____ = _____

20 × _____ = _____



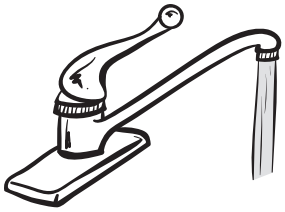
NAME _____ **DATE** _____

Water Conservation page 1 of 2

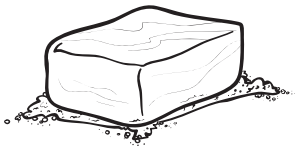
Do you want to help conserve water? Here are some water-saving tips. Be sure to show all of your work for each of these problems.

1a If you leave the faucet running while you take a 5-minute shower, you use about 400 cups of water. How many gallons is that?

Multiplication Menu



b If you get wet, turn off the water to soap up, and turn the water back on to rinse off, you only use about about 64 cups of water. How many gallons is that?



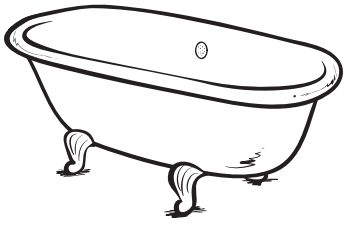
c If you take a shower every day and use the method described in part b above, how many gallons of water can you save in a day? How many gallons of water can you save in a week?

Water Conservation page 2 of 2

2a If you fill the bathtub all the way, it takes about 576 cups of water. How many gallons is that?

b If you fill the bathtub just enough to wash yourself, it takes about 144 cups of water. How many gallons is that?

c If you take a bath 3 times a week and use the second method described above, how many gallons of water can you save in a week? How many gallons of water can you save in a month?



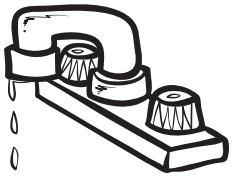
NAME _____ **DATE** _____

Water Conservation Challenge

CHALLENGE

1 If you leave the hose running the whole time you wash a car, it takes about 4,800 cups of water. If you fill a bucket, wash the car, and then rinse it with the hose, it takes about 240 cups of water. How many gallons of water can you save by using a bucket and hose instead of leaving the water running?

2 Mr. Mugwamp has a leaky faucet. It leaks 2 drops of water every second. If there are 3,840 drops of water in a cup, how many gallons of water will be wasted in a single day (24 hours)?



NAME _____ **TEAM NUMBER** _____ **DATE** _____

Lowest Remainder Wins Record Sheet page 1 of 4

) _____	× Menu for _____
) _____	× Menu for _____
) _____	× Menu for _____

SCORE CARD		
	Team 1	Team 2
Round 1		
Round 2		
Round 3		
Total		

Note The lowest score wins.

NAME _____ **TEAM NUMBER** _____ **DATE** _____

Lowest Remainder Wins Record Sheet page 2 of 4

) _____	× Menu for _____
) _____	× Menu for _____
) _____	× Menu for _____

SCORE CARD		
	Team 1	**Team 2**
Round 1		
Round 2		
Round 3		
Total		

Note The lowest score wins.

NAME _____ **TEAM NUMBER** _____ **DATE** _____

Lowest Remainder Wins Record Sheet page 3 of 4

)	× Menu for _____
)	× Menu for _____
)	× Menu for _____

SCORE CARD		
	Team 1	Team 2
Round 1		
Round 2		
Round 3		
Total		

Note The lowest score wins.

NAME _____ **TEAM NUMBER** _____ **DATE** _____

Lowest Remainder Wins Record Sheet page 4 of 4

) _____	× Menu for _____
) _____	× Menu for _____
) _____	× Menu for _____

SCORE CARD		
	Team 1	**Team 2**
Round 1		
Round 2		
Round 3		
Total		

Note The lowest score wins.

NAME _____ DATE _____

Sunflower Seeds page 1 of 2

1 It was the middle of winter and 6 mice were snuggled together in their nest under the floor of the barn. They had 432 sunflower seeds to share equally. How many seeds were there for each mouse?

Multiplication Menu	The Problem:	Estimate:	Figuring Box
1 × ____ = _____			
2 × ____ = _____			
10 × ____ = _____			
20 × ____ = _____			

NAME _____ DATE _____

Sunflower Seeds page 2 of 2

2 Choose one of the other 3 problems on the overhead to solve. Show all of your work below.

Multiplication Menu	The Problem:	Estimate:	Figuring Box
1 × ____ = _____			
2 × ____ = _____			
10 × ____ = _____			
20 × ____ = _____			

NAME _____ **DATE** _____

Comparing, Adding & Subtracting Fraction Pieces

Use your fraction pieces to help solve the problems on this sheet.

1 Use one of the following symbols to make each expression below true.

> (greater than) < (less than) = (equal to)

example $\frac{2}{4}$ [=] $\frac{1}{2}$

a $\frac{1}{16}$ [ ] $\frac{1}{8}$ **b** $\frac{3}{4}$ [ ] $\frac{5}{8}$ **c** $\frac{4}{8}$ [ ] $\frac{1}{2}$

d $\frac{6}{16}$ [ ] $\frac{3}{8}$ **e** $\frac{7}{16}$ [ ] $\frac{1}{2}$ **f** $\frac{12}{16}$ [ ] $\frac{3}{4}$

2 Write a fraction in each blank to make a true statement.

a $\frac{1}{2} >$ _____ **b** $\frac{3}{4} =$ _____ **c** $\frac{2}{8} <$ _____ **d** _____ $= \frac{6}{8}$

e $\frac{4}{16} =$ _____ **f** _____ $< \frac{3}{8}$ **g** $\frac{4}{4} =$ _____ **h** $\frac{2}{4} >$ _____

3 Add these fractions.

a $\frac{1}{8} + \frac{1}{8} =$ _____ **b** $\frac{2}{4} + \frac{1}{4} =$ _____ **c** $\frac{3}{8} + \frac{2}{8} =$ _____

d $\frac{2}{16} + \frac{1}{8} =$ _____ **e** $\frac{2}{4} + \frac{1}{8} =$ _____ **f** $\frac{4}{16} + \frac{2}{4} =$ _____

g $\frac{2}{16} + \frac{6}{16} =$ _____ **h** $\frac{3}{4} + \frac{2}{8} =$ _____ **i** $\frac{1}{2} + \frac{3}{4} =$ _____

4 Subtract these fractions.

a $\frac{2}{4} - \frac{1}{4} =$ _____ **b** $\frac{3}{8} - \frac{1}{8} =$ _____ **c** $\frac{4}{8} - \frac{1}{4} =$ _____

d $\frac{3}{4} - \frac{2}{8} =$ _____ **e** $\frac{7}{16} - \frac{3}{16} =$ _____ **f** $\frac{7}{8} - \frac{1}{2} =$ _____

g $1\frac{1}{4} - \frac{1}{2} =$ _____ **h** $\frac{5}{8} - \frac{2}{16} =$ _____ **i** $\frac{9}{16} - \frac{1}{2} =$ _____

NAME _____ **DATE** _____

Different Ways to Make One page 1 of 2

1 The kids in Miguel's scout troop were getting ready for a hike. They each got to make their own bag of trail mix, and one of the ingredients was 1 cup of chocolate pieces. There was a 1-cup measure for them to use, but some kids got bored waiting for their turn and decided to use the other measuring cups in the set instead: $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, and $\frac{1}{8}$.

Using any combination of those fractions, find as many different ways as you can to make 1 cup of chocolate pieces. Use numbers, words, and/or labeled sketches to show your solutions.

NAME _____ **DATE** _____

Different Ways to Make One page 2 of 2

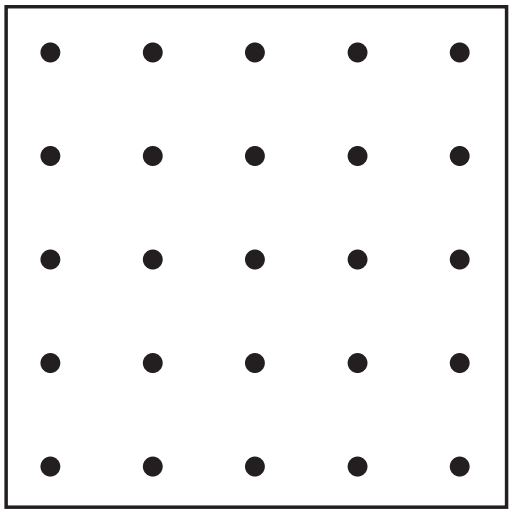
2 Which of the 4 fractions ($\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, and $\frac{1}{8}$) doesn't seem very easy to combine with the others? Why?

CHALLENGE

3 Suppose that the strip below represents $\frac{2}{6}$ of a fruit snack. Create a strip that is equivalent to $\frac{4}{3}$ of a fruit snack and attach it to this sheet. Explain all the steps you took to make the new strip.

NAME _____ **DATE** _____

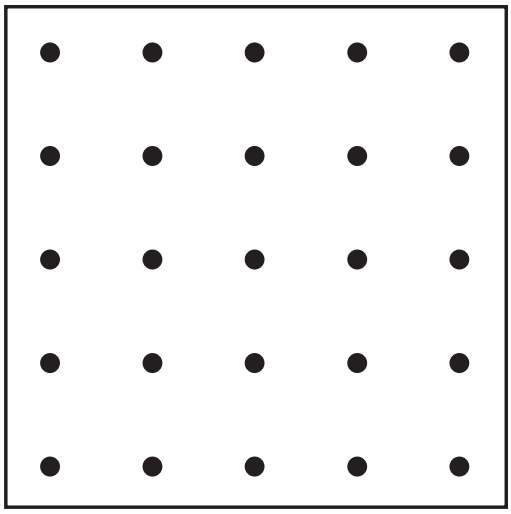
Quilt Block Fractions page 1 of 2



4 Corners

☐ = ☐ = ☐ =

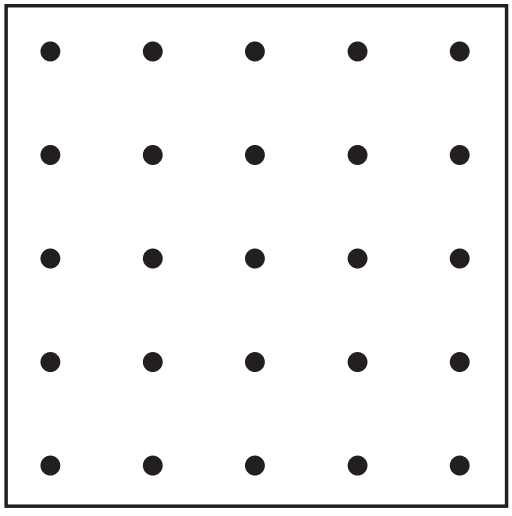
1



Churn Dash

☐ = ☐ = ☐ =

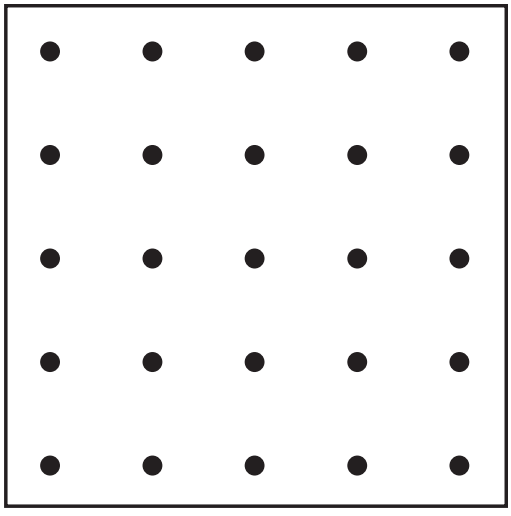
2



Next-Door Neighbors

☐ = ☐ = ☐ =

3



Crosses & Losses

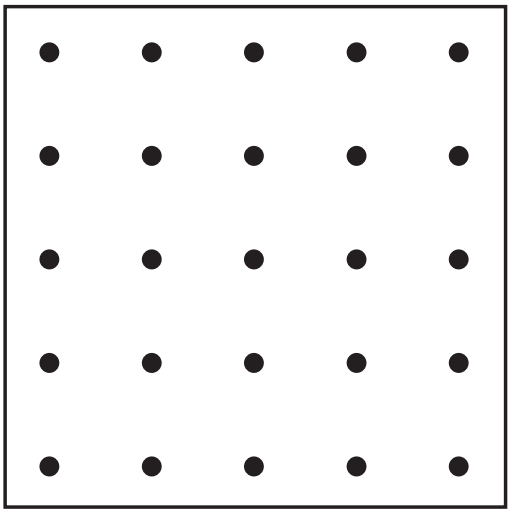
☐ = ☐ = ☐ =

NAME _____ **DATE** _____

Quilt Block Fractions page 2 of 2

CHALLENGE

4



Susannah

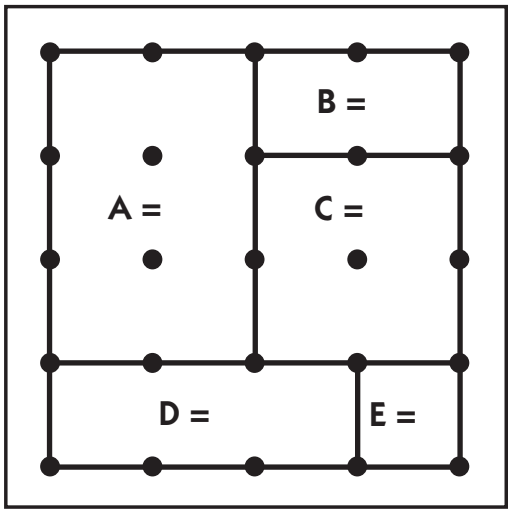
☐ = ☐ = ☐ = ☐ =

Write an equation to show that all the parts add up to 1.

NAME _____ **DATE** _____

Fractions on a Geoboard page 1 of 2

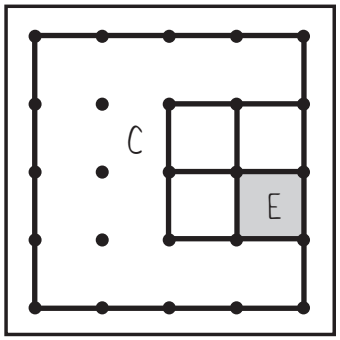
1 Label regions A, B, C, D, and E with the fractions that describe the sizes of their areas, if the whole geoboard has an area of 1.



2 In each box below:

- Make a sketch and write a sentence in words describing a relationship you see between two of the regions on the geoboard.
- Use numbers and symbols like +, −, ×, ÷, =, <, and > to record the relationship in 2 different ways. Note: It's okay to write about a region more than once.

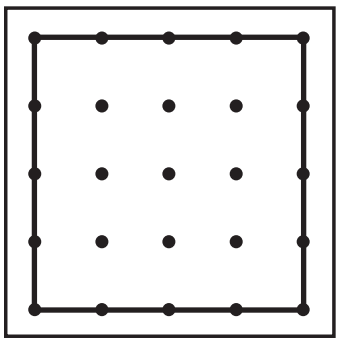
example

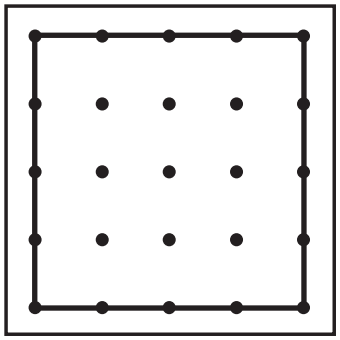


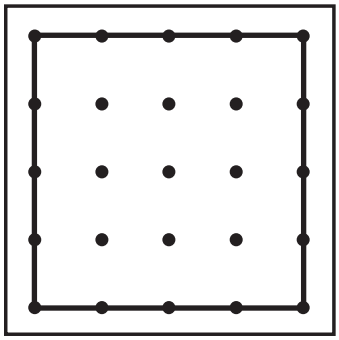
There are 4 E's in Region C.

$\frac{1}{16} + \frac{1}{16} + \frac{1}{16} + \frac{1}{16} = \frac{1}{4}$

$4 \times \frac{1}{16} = \frac{1}{4}$

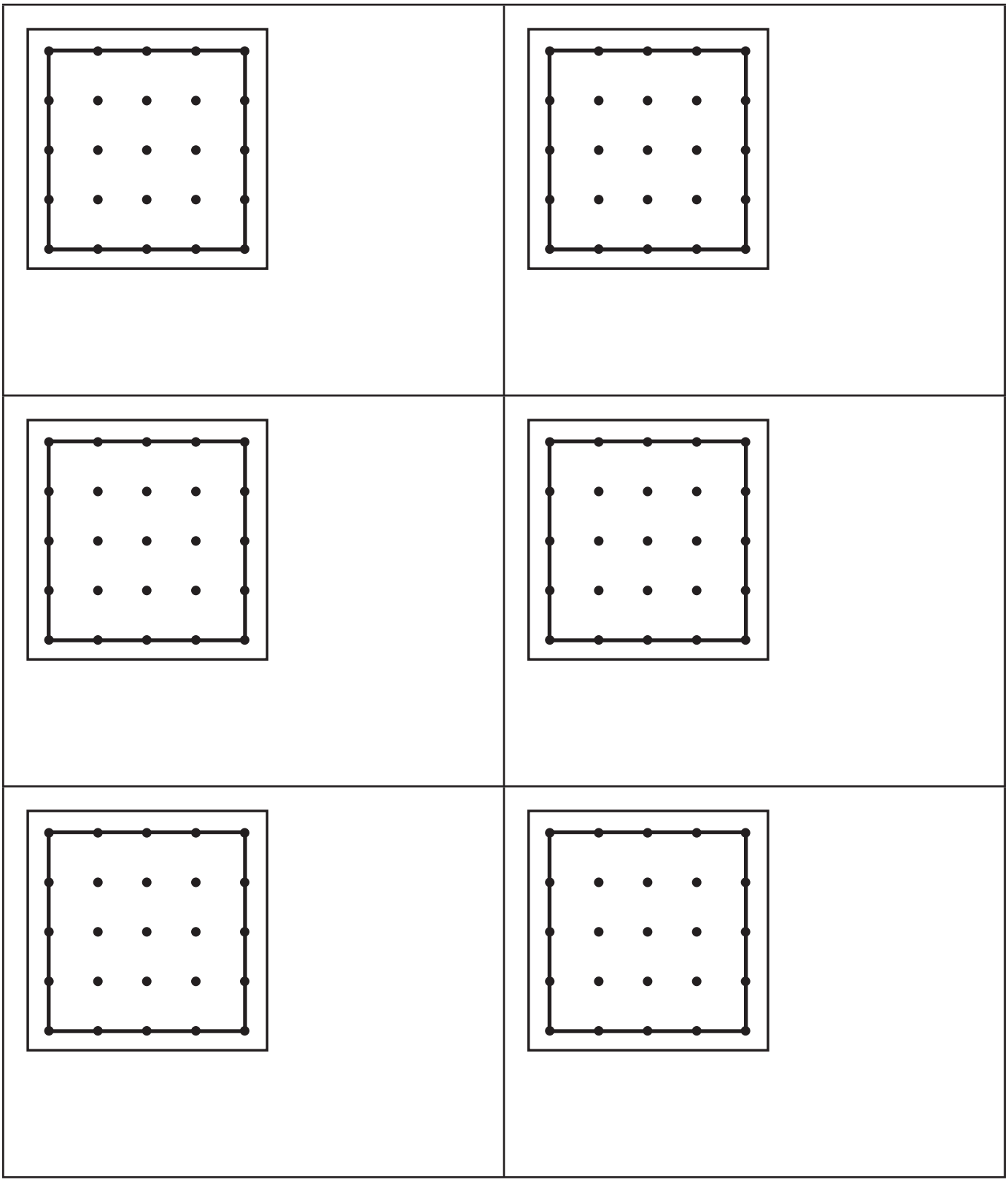






NAME _____ **DATE** _____

Fractions on a Geoboard page 2 of 2



NAME _____ **DATE** _____

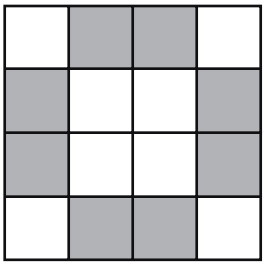
Design Your Own Quilt Blocks page 1 of 2

• Design a symmetrical quilt block on your geoboard. (You can use triangles, parallelograms, and shapes other than squares and rectangles. Your block must have at least 1 line of symmetry or rotational symmetry of order 2 or more.)

• Sketch your design on block 1 below and then color it the way you like best, using 2 to 4 colors.

• Make a key showing how much area each color covers. Remember that the area of the whole block is 1.

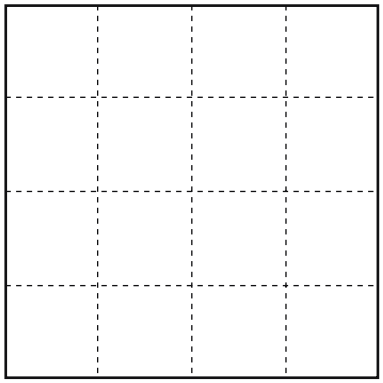
• Design a second and then a third block if you have time. (See if you can design one that has both reflective and rotational symmetry!)



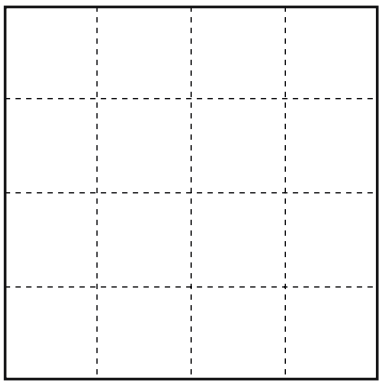
$8 \times \frac{1}{16} = \frac{8}{16}$

$8 \times \frac{1}{16} = \frac{8}{16}$

1



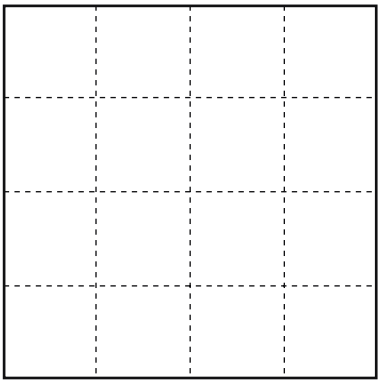
2



NAME _____ **DATE** _____

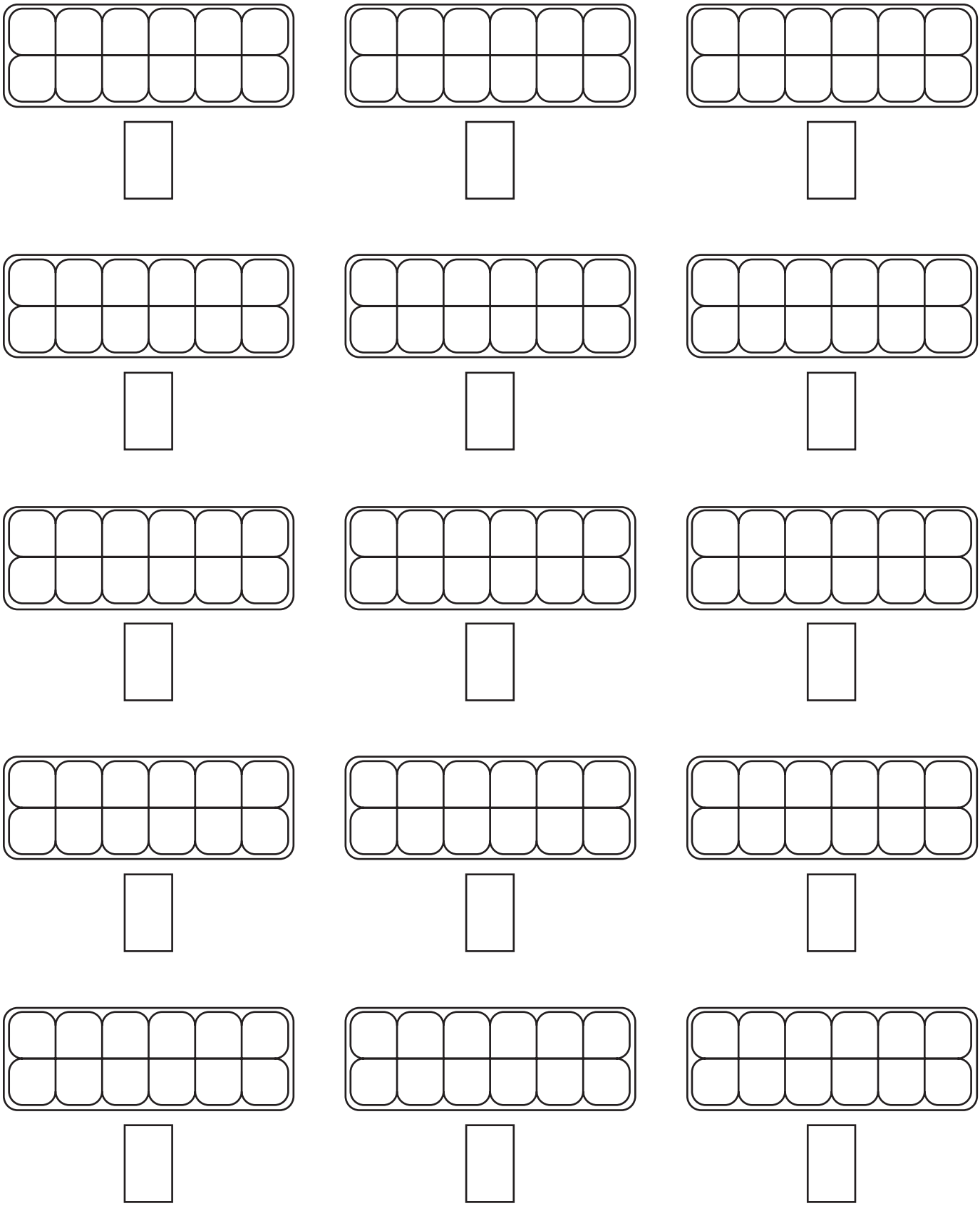
Design Your Own Quilt Blocks page 2 of 2

3



NAME _____ **DATE** _____

Egg Carton Recording Paper



NAME _____ **DATE** _____

Comparing Fractions

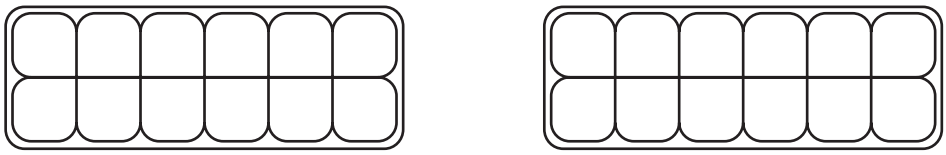
CHALLENGE

1 In the space below, list the fractions you just modeled in order from least to greatest.

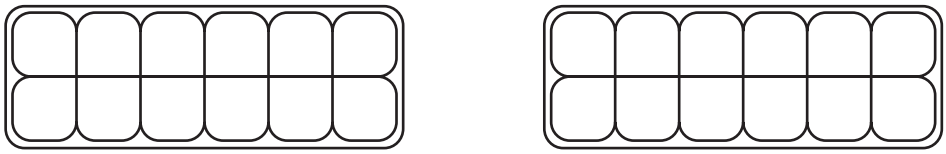
_____ _____ _____ _____ _____ _____ _____ _____

2 Find a partner to work with. For each pair of fractions below, talk about which is larger and why. You can use the egg cartons to model and compare the fractions, but try to see if you can picture them in your head and reason about which must be larger.

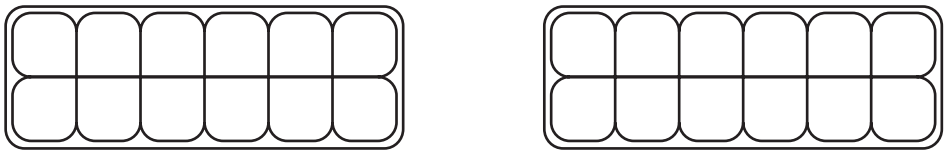
a $\frac{1}{3}$ ____ $\frac{3}{12}$



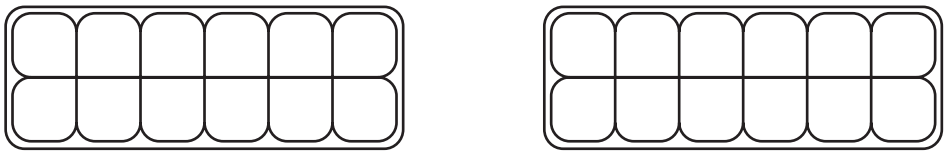
b $\frac{7}{12}$ ____ $\frac{2}{3}$



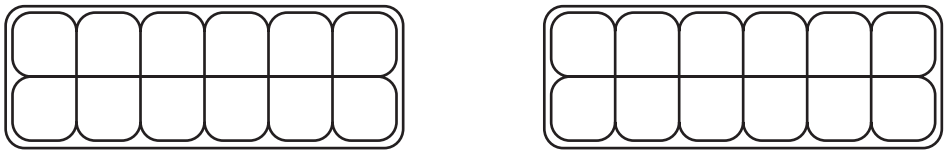
c $\frac{3}{4}$ ____ $\frac{2}{3}$



d $\frac{1}{2}$ ____ $\frac{5}{12}$



e $\frac{5}{12}$ ____ $\frac{1}{3}$

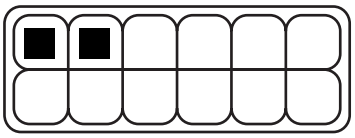


NAME _____ **DATE** _____

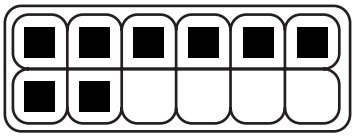
Equivalent Fractions

Write at least 2 different fraction names to describe each collection of eggs. The ones marked with stars have 3 or more different fraction names. See if you can find them all! In problems 9 and 10, each egg carton is worth 1 whole.

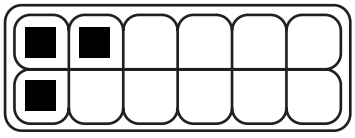
1



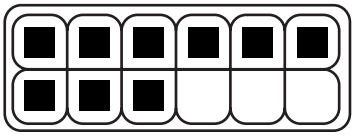
★2



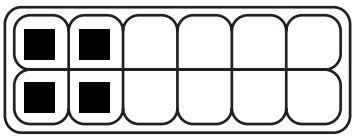
3



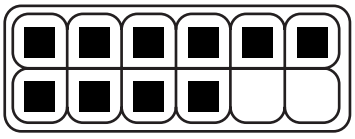
4



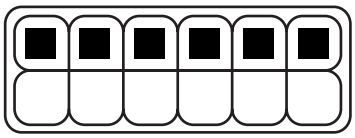
★5



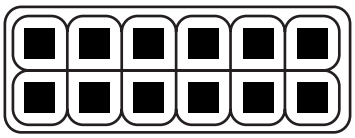
6



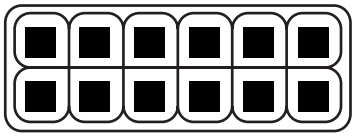
★7

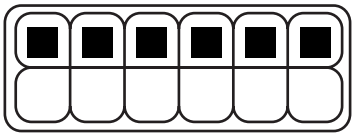


★8

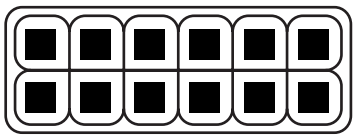


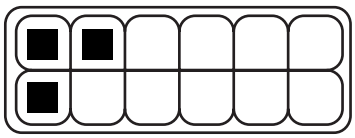
★9





★10



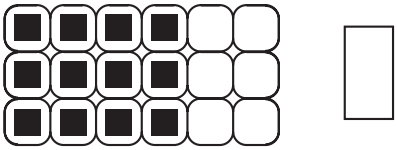


NAME _____ **DATE** _____

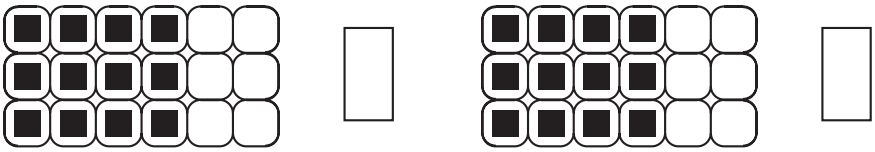
Eggsploration Challenge Sheet

CHALLENGE

1 Jon's dad brought home eggs in an 18-egg carton instead of a 12-egg carton. When Jon opened the carton 3 days later, there were only 12 eggs left in the carton. What fraction of the carton was still filled? Be sure to draw in the lines for string or yarn to show the number of equal parts into which you're dividing the carton.



2 Figure out two other names for the fraction of the carton filled by 12 eggs. Be sure to draw in the lines for string or yarn to show the number of equal parts into which you're dividing the carton.



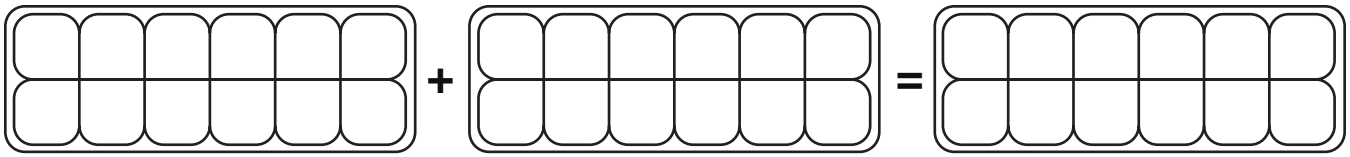
3 On a 12-egg carton, $\frac{1}{6}$ is 2 eggs. On the grid below, sketch 4 different cartons, in which:

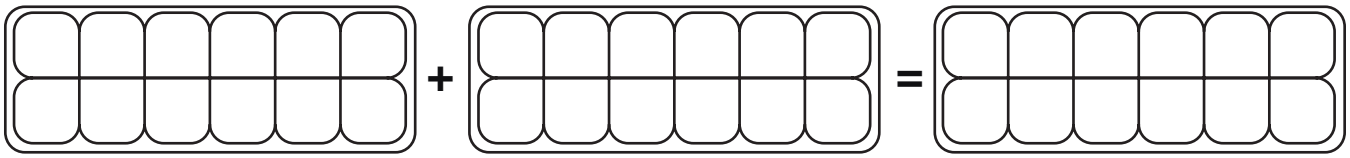
a $\frac{1}{6}$ is 3 eggs **b** $\frac{1}{6}$ is 4 eggs **c** $\frac{1}{6}$ is 6 eggs **d** $\frac{5}{6}$ is 5 eggs

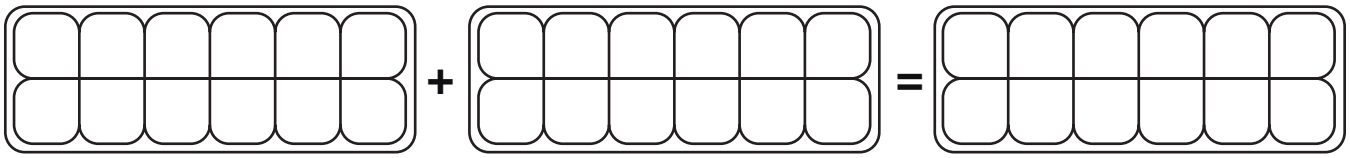
On each carton you sketch, be sure to show the eggs and the yarn lines. Also, label each sketch with its letter.

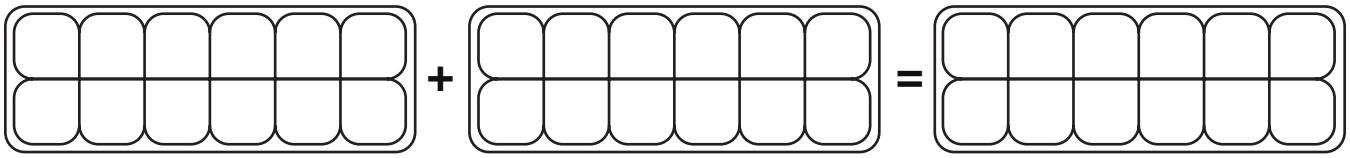
NAME _____ **DATE** _____

Combining Egg Carton Fractions

1  =

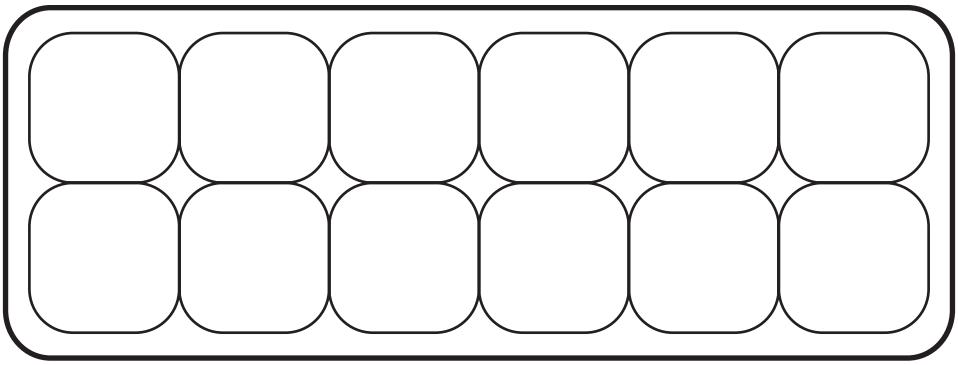
2  =

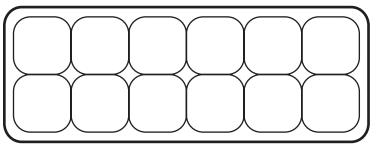
3  =

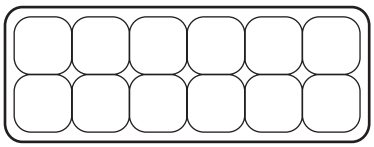
4  =

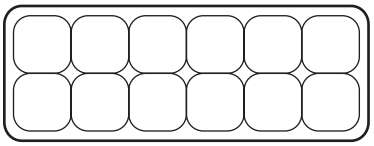
NAME _____ **DATE** _____

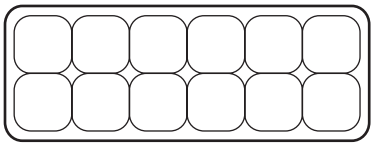
Dozens of Eggs

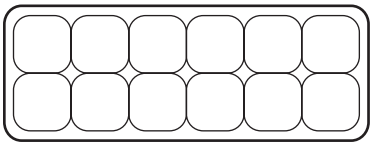


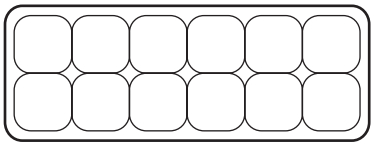


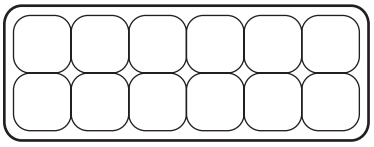


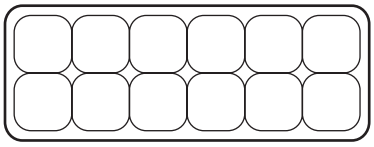












NAME _____ **DATE** _____

Compiling Name Data

1a List the number of letters in each boy's first name in numeric order. Be sure to include every name, so if there are 3 boys with 4 letters in their first names, you'll list 4, 4, 4.

b Determine the range, mode, and median of this data

range = _____ mode = _____ median = _____

2a List the number of letters in each girl's first name in numeric order.

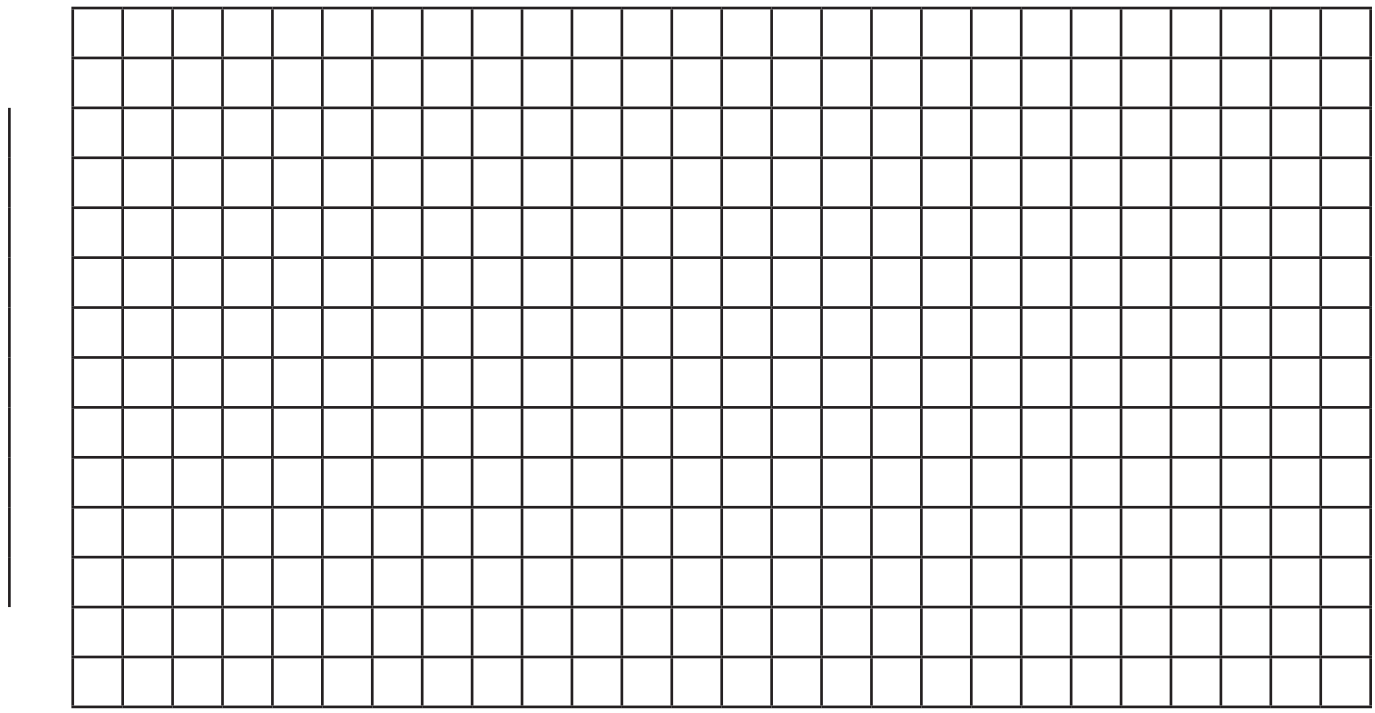
b Determine the range, mode, and median of this data.

range = _____ mode = _____ median = _____

3 Make a labeled double bar graph to display this data on the grid below.

_____

Graph Title



_____

NAME _____ **DATE** _____

Odd Coin Game Probabilities

1 Use your pennies to find all the different ways 3 coins can come up when you flip them at the same time. One of the ways has already been listed for you.

Player 1	Player 2	Player 3
H	H	H

Player 1	Player 2	Player 3

2 Using the information above, list the theoretical probability of getting each of these outcomes during one round of the Odd Coin Game.

Outcome	Probability
All 3 Heads	
2 Heads and 1 Tail	
1 Head and 2 Tails	
All 3 Tails	

3 What is the probability that someone will get a point during one round of the Odd Coin Game? Explain your thinking, using numbers, words, and/or labeled sketches.

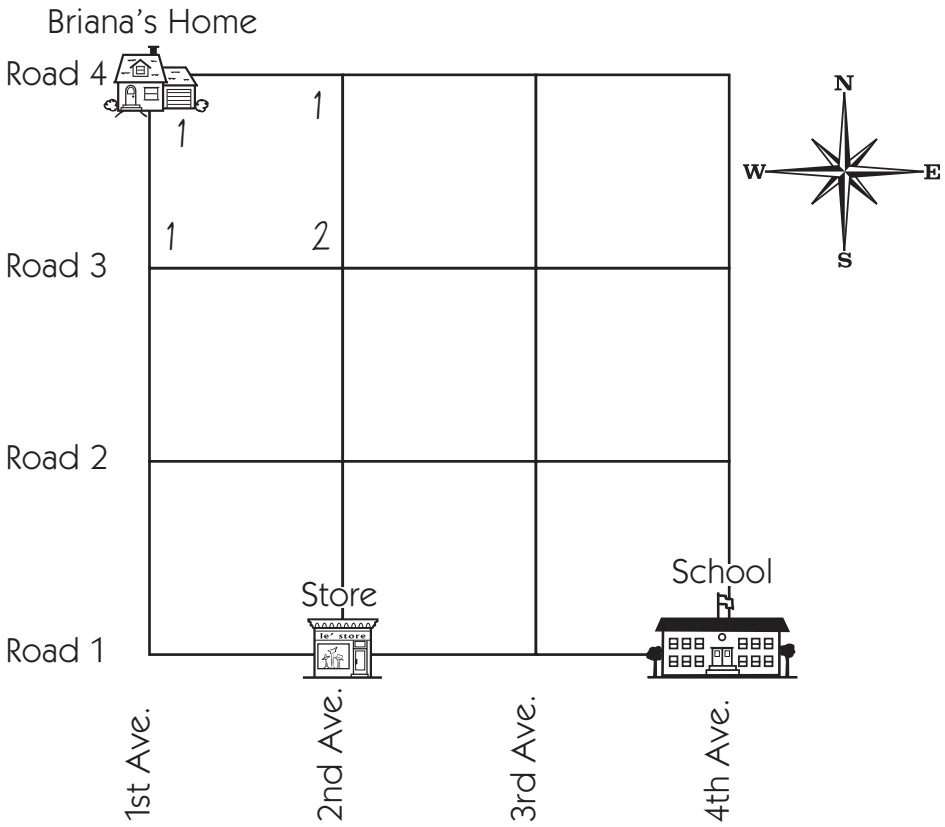
4 What is the probability that no one will get a point during one round of the Odd Coin Game? Explain your thinking, using numbers, words, and/or labeled sketches.

NAME _____ **DATE** _____

How Many Routes to Each Intersection?

1 Count how many routes there are from Briana's house to each and every intersection in her neighborhood. Remember that she's only allowed to go EAST and SOUTH on the roads and avenues in her neighborhood. You may want to use a sheet or more of the mini-grids to make sure you find all of the different ways she can get to each corner.

Record your answers on this grid.

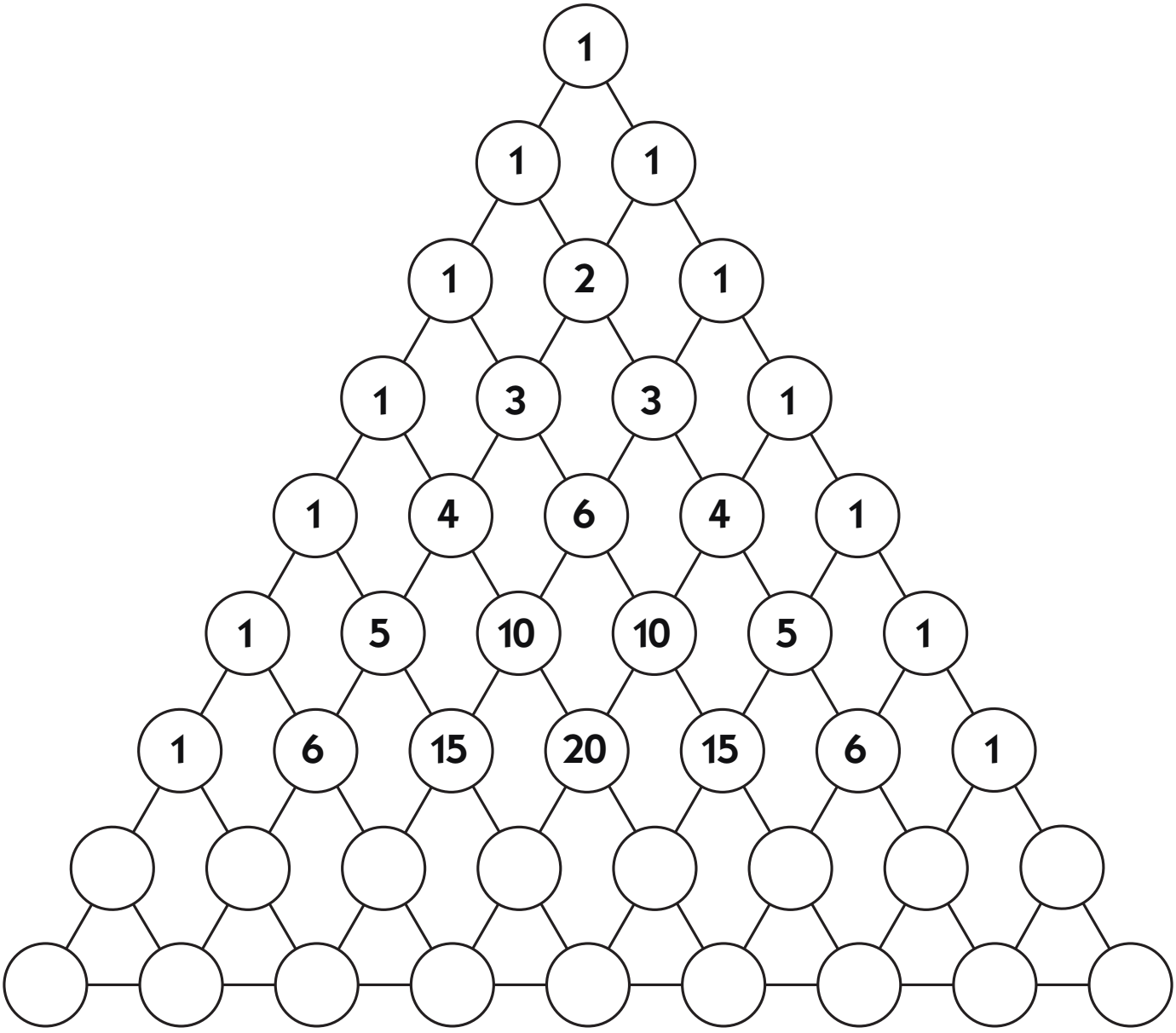


2 Now that you have put numbers at each intersection, what do you notice about the numbers? Do you see any relationships between them? Do you see any patterns? Record any mathematical observations you can about this situation.

NAME _____ **DATE** _____

Pascal's Triangle & Coins page 1 of 2

1 Enter the missing numbers at the bottom of Pascal's Triangle.



2 Describe at least two patterns you notice, and label the triangle above with loops, circles, arrows, numbers, and/or words to show at least one of them.

NAME _____ **DATE** _____

Pascal's Triangle & Coins page 2 of 2

3 Write numbers to tell how many different ways you can get each outcome for the coin situations listed below. Several boxes have been filled in as examples.

Flipping 1 Coin	Heads	Tails
How many different ways?	*1*	

Flipping 2 Coins	Both Heads	1 Head/1 Tail	Both Tails
How many different ways?		*2*	

Flipping 3 Coins	All 3 Heads	2 Heads/1 Tail	1 Head/2 Tails	All 3 Tails
How many different ways?	*1*			

4 Compare the entries in the grids above with the first rows of Pascal's Triangle. What do you notice? Write at least 2 different observations.

5 Fill in the grid below to tell how many ways you can get each outcome.

Flipping 4 Coins	All 4 Heads	3 Heads/ 1 Tail	2 Heads/ 2 Tails	1 Head/ 3 Tails	All 4 Tails
How many different ways?					

CHALLENGE

6 Create a grid to show all the possible outcomes of flipping 5 coins and to tell how many different ways you can get each of them.

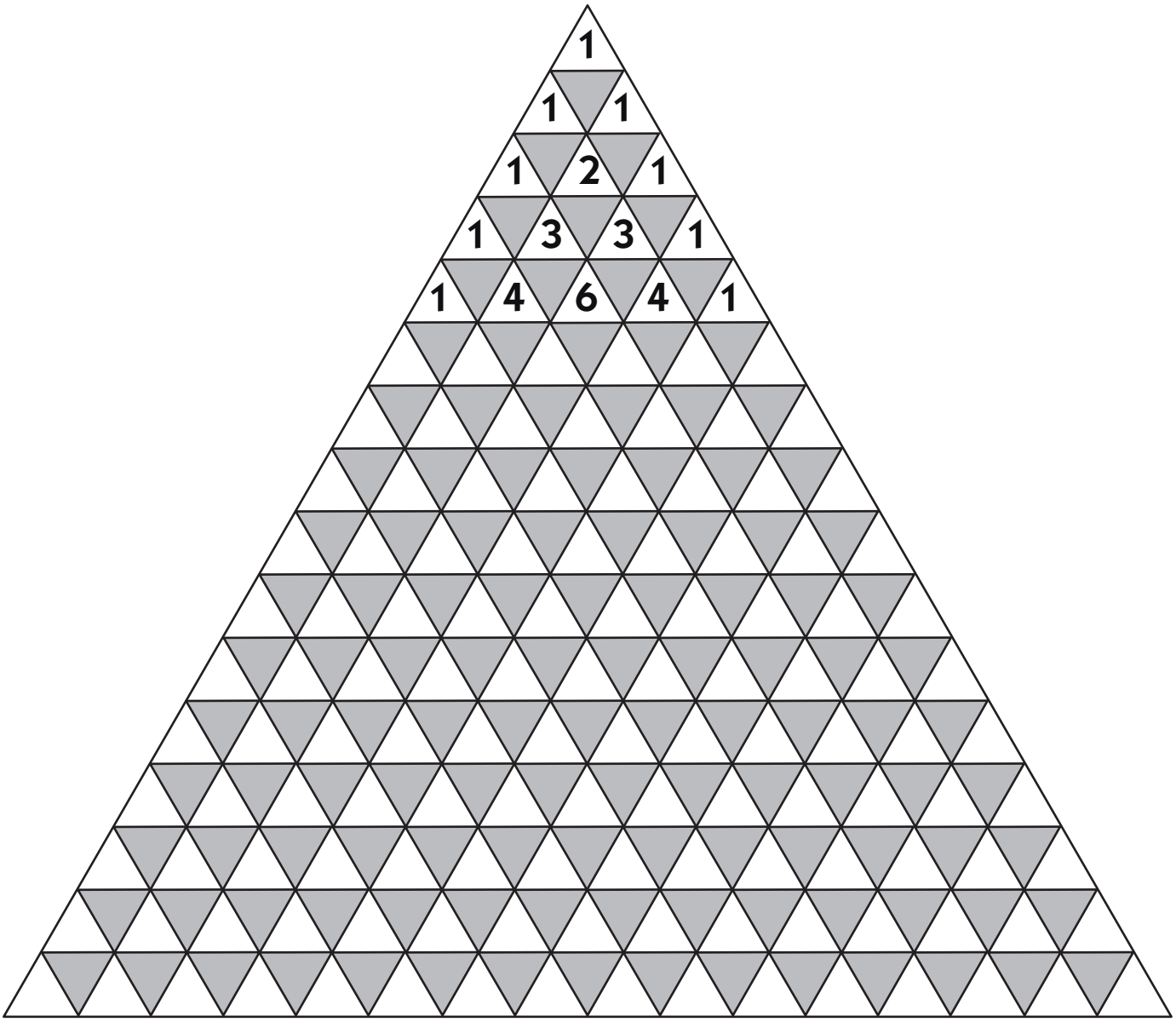
Flipping 5 Coins	
How many different ways?	

NAME _____ **DATE** _____

Pascal's Triangle Color-In Challenge

1 Fill in the white triangles to complete the first 15 rows of Pascal's Triangle. (There are actually 16 rows, but mathematicians call the top one Row Zero.)

2 Color in all the odd numbers (including the 1's).



3 Write at least three mathematical observations about Pascal's Triangle.

NAME _____ **DATE** _____

Lori & Nicole's Dice Game

1 Transfer the Dice Game data gathered by the class to the chart below.

How many times did the class roll 2 even numbers?	How many times did the class roll 1 even and 1 odd number?	How many times did the class roll 2 odd numbers?	How many times did the class roll the dice in all?

2 If you roll 2 dice once, what is the probability of getting each of the possible outcomes? (Mathematicians call these the *theoretical* probabilities.) Use labeled sketches, numbers, and/or words to show how you got your answers.

a 2 evens _____

b 1 even/1 odd _____

c 2 odds _____

3 How do the actual results of the game (which mathematicians would call the experimental probabilities) compare with the theoretical probabilities of getting each outcome?

CHALLENGE

4 If you roll 2 dice numbered 1–6 once, what are the chances that both numbers will be the same (like two 3's or two 6's)? Show your work.

NAME _____ **DATE** _____

The Dragon's Lair Problem

A team of fifth graders went exploring and was captured by a greedy dragon. The dragon imprisoned the fifth graders in her lair and said, "When you can give me 2,000 gold pieces for my treasure pile, I will let you go. But you have only 12 weeks to get the gold pieces." The fifth graders panicked: none of them had any gold pieces!

That night, a mysterious old man came to visit the fifth graders. He said, "I will try to help you get out of here. Each week, I will bring you a certain number of gold pieces, but you must choose how you want to be paid. I will give you until tomorrow to make your choice. Once you have decided, you cannot change your minds." The dragon's lair was hot and smelly, and the fifth graders didn't have much food or water: they wanted to get out of there as soon as possible! These were their choices:

1 They would get 162 gold pieces each week.

2 The first week, they would get 1 gold piece. The second week they would get 2 gold pieces. The third week, they would get 4 gold pieces. Each week, the number of gold pieces would double.

3 They would flip a coin each week. If it landed on tails, they would get 415 gold pieces that week. If landed on heads, they would get no gold pieces that week.

4 Each week they would spin this wheel and the man would give them the number of gold pieces they spun.

a If you were in the dragon's lair with the fifth graders, which choice would you pick and why?

b Would your choice be different if the time period were 14 weeks?

c If the situation were different, and the goal was to collect as many gold pieces as possible in the 12 (or 14) weeks, would you make a different choice? Which would it be and why?

NAME _____ **DATE** _____

The Dragon's Lair Response Sheet page 1 of 2

1 Summarize what is good and what is bad about each choice (the pros and cons of each choice) on the chart below. Use any combination of numbers, words, and pictures to explain your thinking.

Choice Number	What is good about this choice? (Pros)	What is bad about this choice? (Cons)
1		
2		
3		
4		

NAME _____ **DATE** _____

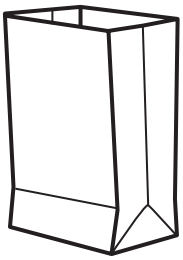
The Dragon's Lair Response Sheet page 2 of 2

2 Explain what choice you would make if you were in the dragon's lair with the fifth graders. Support your ideas with information from the tests you did with your partner, the class chart of ideas and test results, and your chart of pros and cons in part 1 on page 139.

NAME _____ **DATE** _____

Secret Sack Problems page 1 of 2

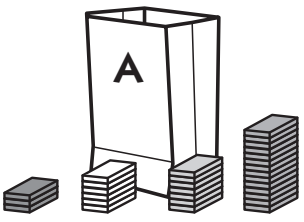
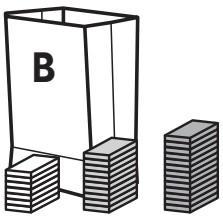
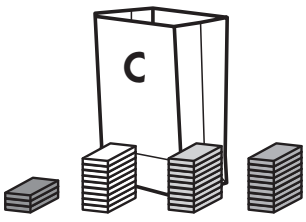
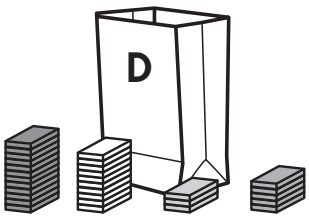
1 There are 30 tile in a paper sack—some are red, some are yellow, some are blue, and some are green. To predict the contents of the sack, 4 students each conduct an experiment. The procedure they use is: without looking, draw one tile; record its color; return the tile to the sack; and then repeat for a total of 30 draws each. The results of their experiments are shown below.



	Logan	Julia	Braidie	Sierra
Red	1	2	0	4
Yellow	8	5	8	3
Blue	7	10	9	5
Green	14	13	13	18

Based on the information above, write what you think are likely to be the contents of the sack. Use labeled sketches, numbers, and/or words to support your decision.

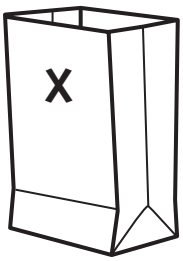
2 Compare the following sacks to what you think might be in the original sack in Problem 1. Label each sack as either Impossible, Unlikely, Not Sure, or Likely, and write a reason for each of your decisions.

 3 red, 6 yellow, 7 blue, 14 green	 0 red, 7 yellow, 10 blue, 13 green	 3 red, 9 yellow, 9 blue, 9 green	 12 red, 10 yellow, 3 blue, 5 green

NAME _____ **DATE** _____

Secret Sack Problems page 2 of 2

3 This sack contains a total of 36 red, blue, and green square tile. If a tile is drawn from the sack at random, the theoretical probability of getting a red tile is $\frac{1}{4}$. The theoretical probability of getting a green tile is $\frac{1}{3}$. Use this information to figure out how many of each color tile there are in the sack. Show your work using labeled sketches, numbers, and/or words.

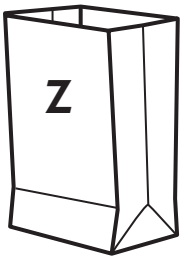


Red _____

Blue _____

Green _____

4 Shanda is going to draw a tile randomly from this sack of 24 red, blue, and green tile. The theoretical probability of getting a green tile is $\frac{1}{4}$. There are twice as many blue tile as red tile in the sack. Use this information to figure out how many of each color tile there are in the sack. Show your work using labeled sketches, numbers, and/or words.



Red _____

Blue _____

Green _____

5 There are 30 pieces of bubble gum with colors of blue, yellow, and green in a machine. The theoretical probability of getting a blue is $\frac{3}{10}$. The theoretical probability of getting a green is 50%.

Make a sketch to show this situation. Next to your sketch, write 3 or more interesting mathematical observations about the situation. Use another piece of paper if you need more room.

NAME _____ **DATE** _____

Class Survey Procedures

My Partner's Name _____

Below is a checklist for conducting a survey.

___ Choose a topic.

___ Write your question(s).

___ Conduct your survey.

___ Organize your results.

___ Create a display to present your results.

1 Write 2 questions you'd like to ask about the topic your class chose. Write your questions exactly the way you'd like to see them worded for your survey.

2 What do you predict the results of your survey will be? Explain your answer.

NAME _____ **DATE** _____

Interpreting the Data

1 List at least 5 conclusions someone could make about the class survey data by looking at your group's displays. Put a star by the one or two conclusions you think are most important.

2 The students in your group have chosen several different ways to display the class survey results. Compare and contrast these methods. How are they alike and how are they different? To you, which *type* of display (table, bar graph, circle graph, Venn diagram, etc.) seems easiest to read and understand? Why?

3 If you conducted the same survey in another fifth grade in your school, do you think you'd get similar results? Why or why not?

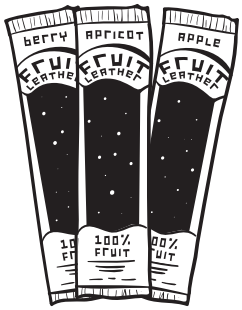
4 If you conducted the same survey among fifth graders in a different part of the country, do you think you'd get similar results? Why or why not?

NAME _____ **DATE** _____

Division Problems page 1 of 2

Work with a partner to solve at least two of the three problems on this page and the next. Use numbers, words, and labeled sketches to show all of your thinking. If you solve all three and have extra time, start the challenge problem on the next page.

1 Sally and her friends Vanessa, Ellie, and Helen have 3 strips of dried fruit to share. Each strip is 1″ wide and 12″ long. If the 4 girls share the strips fairly, how much will they each get?



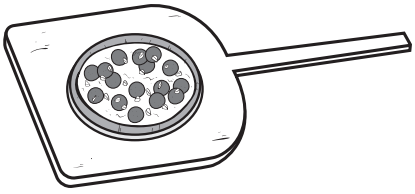
2 One Saturday morning, Eduardo and his sister invited their two friends over to play. Before long, things were getting pretty noisy around the house, and Mrs. Ortega said, "If the four of you will pick up all the toys downstairs, I'll give you $3.00 to spend at the corner store." If the 4 kids share the $3.00 fairly, how much money will they each get?

Division Problems page 2 of 2

3 The gym at our school is open every evening from 5:00 to 8:00. If 4 different basketball teams want to use the gym on Thursday evening and they agree to split the time equally, how much practice time will each team get?

CHALLENGE

4 The coach took us out for pizza after our last game. There were 14 of us, so we had to split up and sit at different tables. Six of us sat at one table and got 4 mini-pizzas to share equally. The other 8 of us sat at a different table and got 6 mini-pizzas to share equally. Afterwards, Keira said it wasn't fair because some kids got more pizza than others. Do you agree with her? Use numbers, words, and/or labeled sketches to explain your answer.



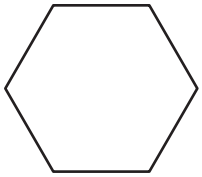
NAME _____ **DATE** _____

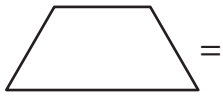
Pattern Block Fraction Challenge page 1 of 2

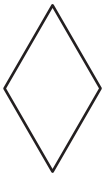
CHALLENGE

Use your pattern blocks to help solve the problems on this page and the next.

1 If the yellow hexagon is worth 3, what is the value of the red trapezoid, the blue rhombus, and the green triangle? Use numbers, words, and/or labeled sketches to explain your answers.

 = 3

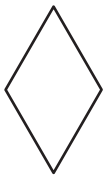
 = ____

 = ____

 = ____

2 If the red trapezoid is worth 2, what is the value of the blue rhombus and the green triangle? Use numbers, words, and/or labeled sketches to explain your answers.

 = 2

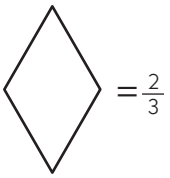
 = ____

 = ____

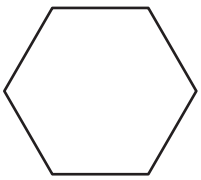
Pattern Block Fraction Challenge page 2 of 2

CHALLENGE

3 If the blue rhomus is worth $\frac{2}{3}$, what does the whole figure look like? Make a labeled sketch to show the answer. Use words and numbers to explain your thinking.

 $= \frac{2}{3}$? = 1

4 If the yellow hexagon is worth $\frac{3}{4}$, what does the whole figure look like? Make a labeled sketch to show the answer. Use words and numbers to explain your thinking.

 $= \frac{3}{4}$? = 1

NAME _____ **DATE** _____

Thinking about Equivalent Fractions page 1 of 2

1a Get a partner and decide whose fraction cards to use.

b Mix up all 18 cards (star, lightening bolt, and plain corners) and place them face-down between you and your partner.

c Each of you choose 2 cards out of the pile without looking.

d Write a true statement about the two fractions you got, using one of these signs: =, < (less than), or > (greater than).

e Use numbers and labeled sketches to prove that your statement is true.

f Repeat this three times, and show your work in the boxes below.

example

$\frac{1}{2} = \frac{3}{6}$

$\frac{1 \times 3}{2 \times 3} = \frac{3}{6}$

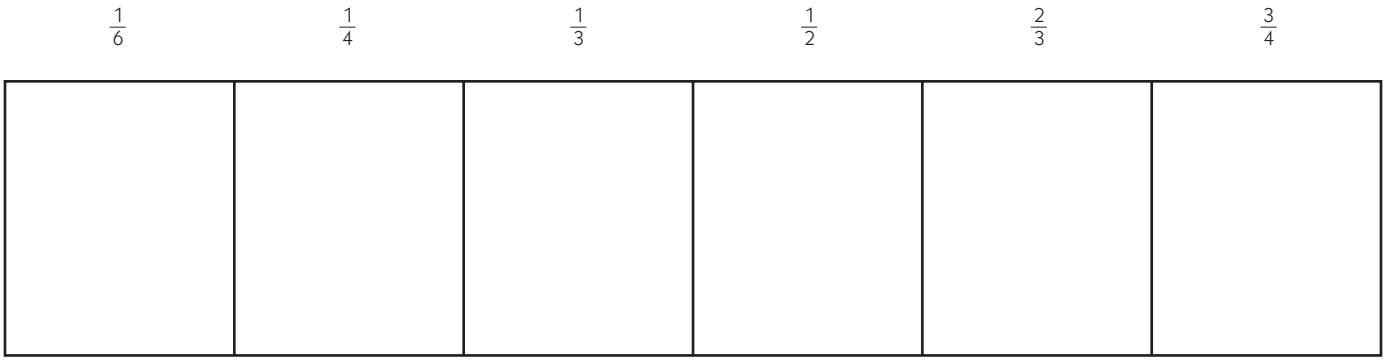
Thinking about Equivalent Fractions page 2 of 2

2a When you're finished with the first part of this assignment, get a strip of heavy paper or cardstock from your teacher.

b Cut the strip into sixths so you have 6 more fraction cards.

c Then create your own set of equivalent fractions for $\frac{1}{6}$, $\frac{1}{4}$, $\frac{1}{3}$, $\frac{1}{2}$, $\frac{2}{3}$, and $\frac{3}{4}$. Write one fraction on each card and add these to your set.

d Record your new fractions in the boxes below.



CHALLENGE

3a Measure the line below and make a mark along the line to show exactly where each of these fractions belongs. Be sure to label each mark with the name of the fraction.

b Explain how you figured out where to place each fraction along the line.

NAME _____ **DATE** _____

More Fraction Story Problems page 1 of 2

For each problem on this page and the next:

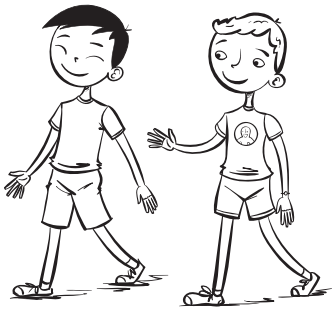
- Write an equation to match the problem.
- Solve the problem and show your thinking with numbers, words, and/or labeled sketches.
- If the answer turns out to be an improper fraction (like $\frac{3}{2}$ or $\frac{7}{4}$) rename it as a mixed number (like $1\frac{1}{6}$ or $1\frac{3}{4}$).

1 Last Saturday, Mike spent $\frac{1}{3}$ of an hour cleaning the hamster cage and $\frac{1}{4}$ of an hour walking the dog around the block. What part of an hour did he spend taking care of his pets?

2 Latisha was planning to spend $2\frac{1}{2}$ hours with a friend on Saturday, but her mom said she had to finish her chores first. If it took her $\frac{3}{4}$ of an hour to do her chores, how much time did she have left to spend with her friend?

More Fraction Story Problems page 2 of 2

3 Zack and his friend Noah jogged $\frac{5}{6}$ of a mile and walked another $\frac{1}{3}$ of a mile. How far did they go in all?



4 Hayley and her dad went out for a bike ride. They rode $2\frac{3}{4}$ miles to the lake and then rode back home. How many miles did they bike in all?

CHALLENGE

5 Madison went to the mall with her big sister last weekend. Their mom dropped them off at 1:00 and said, "I'll pick you up at 2:30." The girls spent $\frac{5}{6}$ of an hour at the toy store, $\frac{2}{3}$ of an hour at the pet store, and $\frac{1}{2}$ an hour at the food court. When they got back to the bench to meet their mom, she was already there. She said, "Where have you been? I've been waiting ____ of an hour for you!" How long had their mom been waiting for them?

NAME _____ **DATE** _____

Spin, Add & Compare Fractions Record Sheet

Round 1			
	Teacher	Class	Compare
Spin			
Add			
Rename			
Points			

Round 2			
	Teacher	Class	Compare
Spin			
Add			
Rename			
Points			

Round 3			
	Teacher	Class	Compare
Spin			
Add			
Rename			
Points			

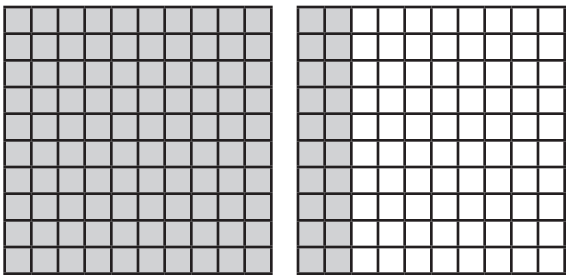
	Teacher	Class
Final Scores		

NAME _____ **DATE** _____

Decimal Color & Order page 1 of 2

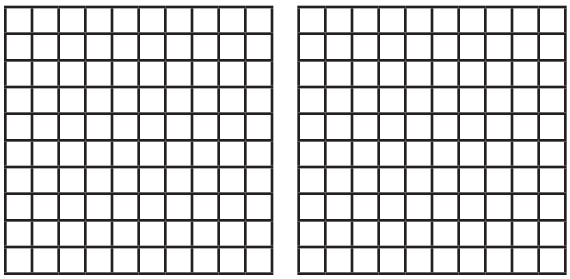
1 In each box below, color in the grids to show the number. Then write the number the way you'd read it over the phone to someone. The first one is written for you.

example



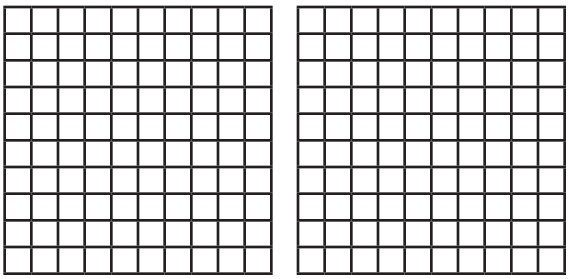
1.2 one and two tenths

a



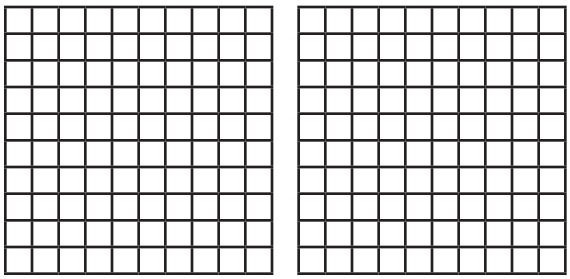
1.02 _____

b



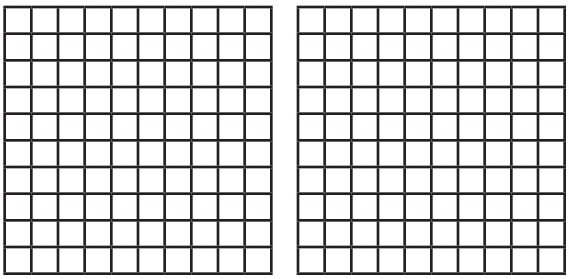
1.21 _____

c



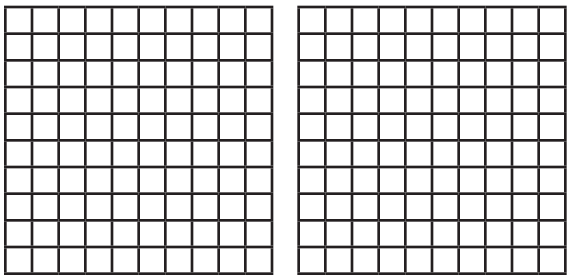
0.12 _____

d



0.21 _____

e



2 _____

2 List the numbers from the boxes above, including the example, on these lines. Write them in order from least to greatest.

_____ < _____ < _____ < _____ < _____ < _____

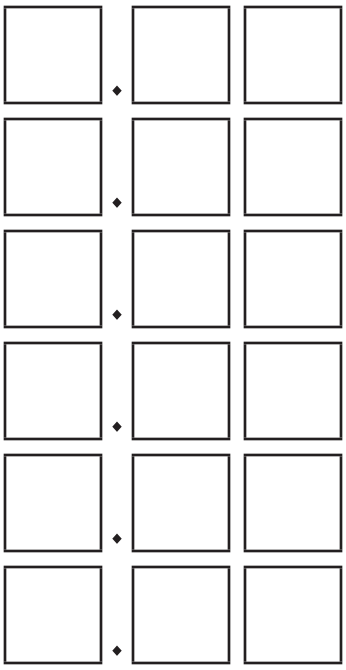
NAME _____ **DATE** _____

Decimal Color & Order page 2 of 2

3 Jana says that 0.16 is greater than 0.4 because 16 is greater than 4. Do you agree with her? Use numbers, words, and/or labeled sketches to explain your answer.

CHALLENGE

4 Use the digits 2, 4, and 6 to create six different decimal numbers and write them in the boxes below. When you're finished, write the numbers in order from least to greatest.



_____ < _____ < _____ < _____ < _____ < _____

NAME _____ **DATE** _____

Fraction & Decimal Equivalents page 1 of 2

1 Fill in the chart. Use any tools to help except a calculator. The first row has been completed as an example.

Fraction of a Dollar	Coin Name	Dollars & Cents Notation	Decimal
$\frac{1}{2}$	half dollar	$0.50	0.50
$\frac{1}{4}$			
$\frac{1}{10}$			
$\frac{1}{5}$			
$\frac{1}{20}$			
$\frac{1}{100}$			

2 Jacob says that 0.40 and 0.04 are equal. Do you agree with him? Use numbers, words, and/or labeled sketches to explain your answer.

3 Vy says that 0.6 and 0.60 are equal. Do you agree with her? Use numbers, words, and/or labeled sketches to explain your answer.

NAME _____ **DATE** _____

Fraction & Decimal Equivalents page 2 of 2

4 Show your thinking for each question below.

a If $25 is shared equally by two people, how much does each person get?

b If $100 is shared equally by three people, how much does each person get?

CHALLENGE

c If 6 children were given a dollar to share, how many cents would they each get? How do you think they would handle the remainder?

NAME _____ DATE _____

Fractions & Decimals Chart

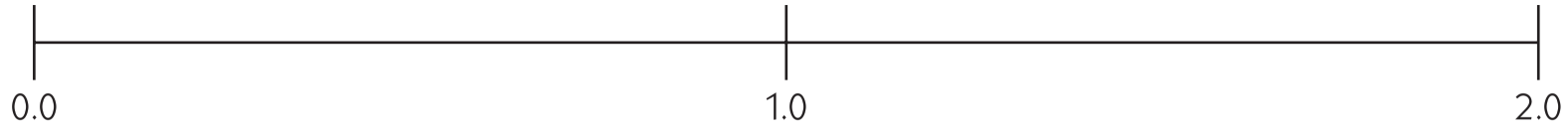
		$\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{5}$	$\frac{2}{5}$	$\frac{3}{5}$	$\frac{4}{5}$	$\frac{3}{4}$	$\frac{1}{8}$	$\frac{1}{3}$
Tenths	Fraction									
	Decimal									
Hundredths	Fraction									
	Decimal									
Thousandths	Fraction									
	Decimal									

NAME _____ DATE _____

Decimals on a Number Line

1 Use a base ten linear piece to locate and mark these decimals on the number line. Write the numbers above the line.

0.1 0.4 0.8 1.2 1.5 1.8



2 Mark and label the approximate locations of these decimals on the number line. Write the numbers below the line.

0.25 0.75 0.62 1.55 0.04 1.91 1.08 1.69

3 Continue to use a base ten linear piece to help you determine which numbers on the number line are:

a between $\frac{1}{2}$ and $\frac{9}{10}$: _____, _____, _____

b closest to but not equal to 0.7: _____

c between 0.9 and 1.2: _____

d less than $\frac{1}{2}$: _____, _____, _____, _____

e less than $1\frac{3}{4}$ but greater than $1\frac{1}{5}$: _____, _____, _____

NAME _____ **DATE** _____

Adding & Subtracting Decimals page 1 of 2

1 Two weeks ago, we got 1.48 inches of rain in our town. Last week, we only got 0.09 inches of rain. How much rain have we had over the last 2 weeks? Show your work.

2 At 5:00 a.m. on April 16, 2006, the temperature in Durham, North Carolina, was 65.5ºF. By 5:00 p.m. that day, the temperature was 86.0º F. How much did the temperature increase over those 12 hours? Show your work.

3 At 5:00 a.m. on April 16, 2006, the temperature in Casper, Wyoming, was 46.7ºF. By 4:00 p.m. that afternoon, the temperature had gone up by 24.4 degrees. What was the reading on the thermometer at 4:00 p.m.? Show your work.

4 In Ketchikan, Alaska, they get an average of 155.22 inches of rain a year. In Yuma, Arizona, they get an average of 2.65 inches of rain a year. How much more rain do they get each year in Ketchikan than in Yuma? Show your work.

Adding & Subtracting Decimals page 2 of 2

5 Estimate the answer to each problem below and record your estimate in the box. Then write the problem in vertical form and add or subtract to find the exact answer.

Problem	Estimate	Vertical Problem and Solution
a 2.25 + 3.08		
b 2.30 + 12.4		
c 7.05 – 0.60		
d 56.1 – 1.09		

NAME _____ **DATE** _____

Decimal Challenge Problems page 1 of 2

CHALLENGE

1 Akiko and 3 of her friends were in a gynmastics meet last weekend. They each did a tumbling routine on the floor mat. Their scores are listed on the chart below. Use the clues to figure out which gymnast got each score.

8.4 5.2 6.1 6.9

Akiko's score is 1.5 points higher than Sam's score.

Danny's score is 0.9 points lower than Natasha's score.

a Akiko's score: _____

b Sam's score: _____

c Danny's score: _____

d Natasha's score: _____

2 Add across and down to fill in the missing numbers inside and outside the grid on the left. The numbers on the lines outside the boxes are the sums. Use the blank grid to make up a puzzle for a classmate.

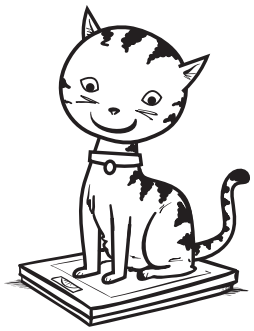
a

6.9		9.7
7.4	3.6	_____
	5.7	9.2
17.8	_____	

b

		_____
		_____
		_____
_____	_____	

Decimal Challenge Problems page 2 of 2



3 Bubba, the kitten, weighed 42.5 ounces when he was 9 weeks old. Three weeks later he weighed 64.5 ounces.

a How many ounces did Bubba gain in those 3 weeks?

b Kittens usually gain about 4 ounces every week. How does Bubba's weight gain compare to what a typical kitten gains in 3 weeks?

c How many pounds did Bubba weigh when he was 12 weeks old? (There are 16 ounces in a pound.)

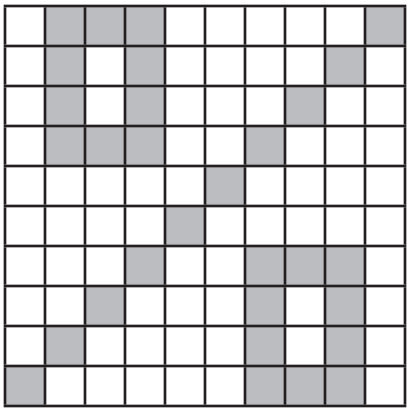
NAME _____ **DATE** _____

More Percent, Decimal & Fraction Grids page 1 of 3

For each grid on this page and the next two:

- Record a number to show the percent of the grid that is shaded.
- Write the decimal that is equivalent to the percent.
- Write at least two equivalent fractions to show the amount of the grid that is shaded.

1

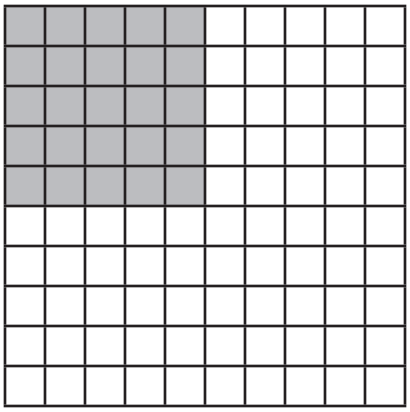


a Percent _____

b Equivalent Decimal _____

c Two Equivalent Fractions _____

2

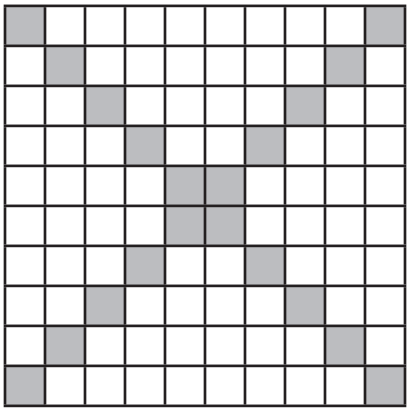


a Percent _____

b Equivalent Decimal _____

c Two Equivalent Fractions _____

3

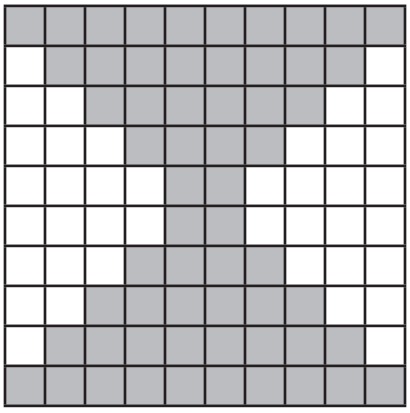


a Percent _____

b Equivalent Decimal _____

c Two Equivalent Fractions _____

4



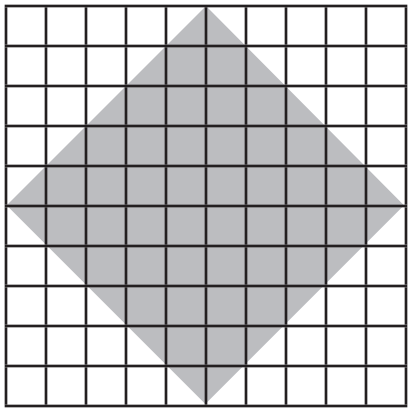
a Percent _____

b Equivalent Decimal _____

c Two Equivalent Fractions _____

More Percent, Decimal & Fraction Grids page 2 of 3

5

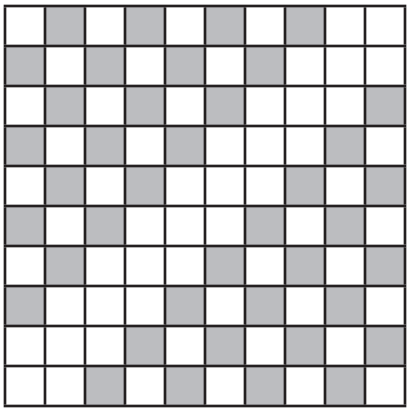


a Percent _____

b Equivalent Decimal _____

c Two Equivalent Fractions _____

6

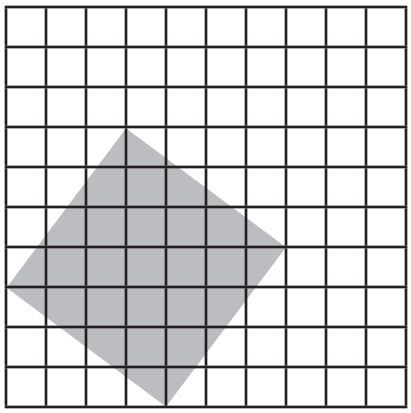


a Percent _____

b Equivalent Decimal _____

c Two Equivalent Fractions _____

7

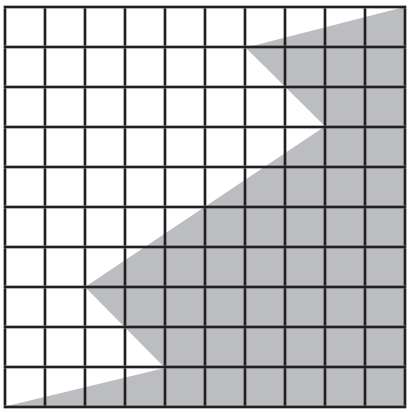


a Percent _____

b Equivalent Decimal _____

c Two Equivalent Fractions _____

8



a Percent _____

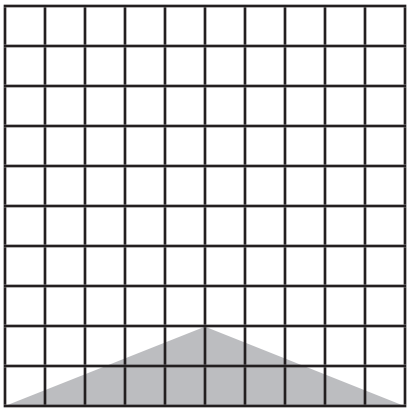
b Equivalent Decimal _____

c Two Equivalent Fractions _____

NAME _____ **DATE** _____

More Percent, Decimal & Fraction Grids page 3 of 3

9

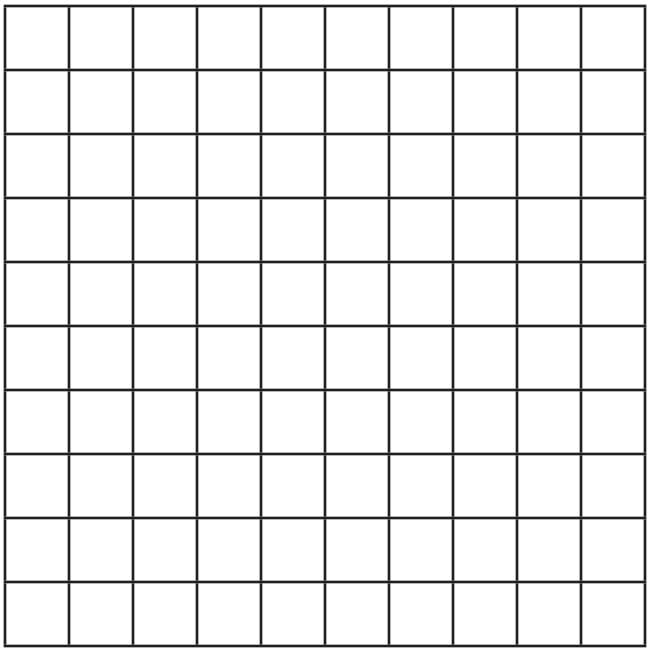


a Percent _____

b Equivalent Decimal _____

c Two Equivalent Fractions _____

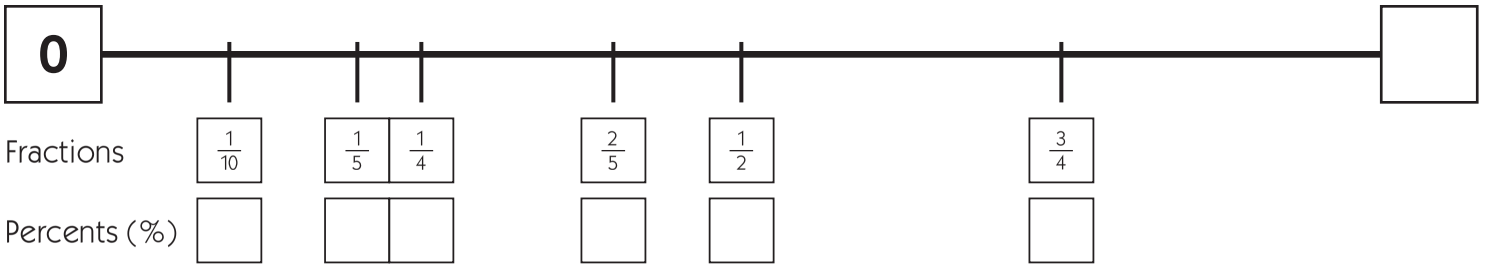
10 Color in this grid with four different colors. You can choose any four colors you want, but you have to color in every square, and your design must have at least one line of symmetry. When you're finished, make a key to show what percent of the grid is filled by each color.



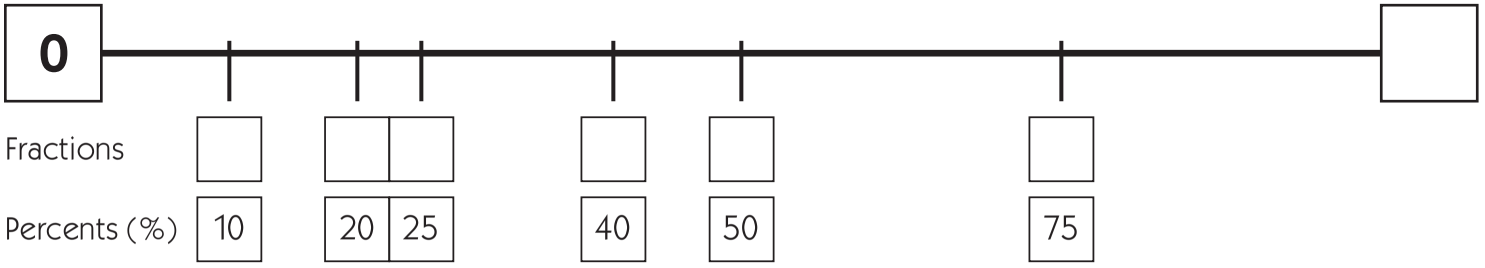
KEY

NAME _____ TEAM COLOR _____ DATE _____

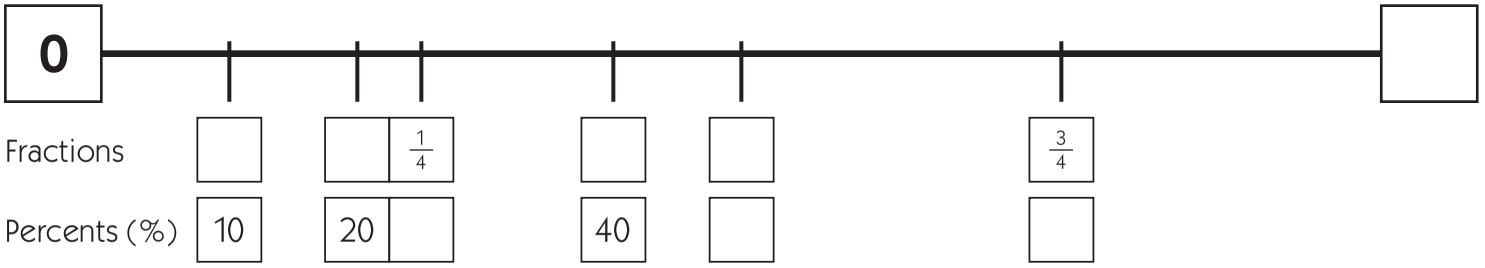
Number Line Game Record Sheet



Points	
Blue	Red



Points	
Blue	Red

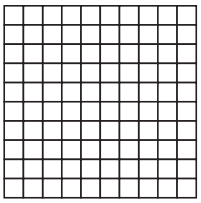


Points	
Blue	Red

Total

NAME _____ **DATE** _____

Roll & Compare Decimals Record Sheet



One . 1 Tenth □ 1 Hundredth ‖ 1 Thousandth

> Greater Than
< Less Than

Round 1 More or Less		
Team 1	Team 2	Difference
□.□□□	□.□□□	

Round 2 More or Less		
Team 1	Team 2	Difference
□.□□□	□.□□□	

Round 3 More or Less		
Team 1	Team 2	Difference
□.□□□	□.□□□	

Totals		
Team 1	Team 2	Total Difference
□□.□□□	□□.□□□	

Final Score	
Team 1	Team 2

NAME _____ **DATE** _____

The Operations Game Record Sheet Two-Team Version

Order of Operations
1. If there are parentheses, do whatever is inside them first. 2. Multiply and divide from left to right. 3. Add and subtract from left to right.

Red Team _____ Blue Team _____

a _____	**f** _____
b _____	**g** _____
c _____	**h** _____
d _____	**i** _____
e _____	**j** _____

Red Team Total Score _____ Blue Team Total Score _____

The Operations Game Record Sheet Two-Player Version

Player 1 _____ Player 2 _____

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Player 1 Total Score _____ Player 2 Total Score _____

NAME _____ **DATE** _____

Algebra Puzzles Game 1

Red Team _____ Blue Team _____

1 ◯ + ____ = ____ ◯ − □ = ____ ◯ + □ + ⬠ = ____	**2** ◯ × ____ = ____ ◯ + □ = ____ (◯ × □) ÷ ⬠ = ____
◯ = ____ □ = ____ ⬠ = ____	◯ = ____ □ = ____ ⬠ = ____
3 ◯ × ____ = ____ ◯ × □ = ____ (◯ × □) ÷ ⬠ = ____	**4** ____ ÷ ◯ = ____ ◯ + □ = ____ (□ − ◯) × ⬠ = ____
◯ = ____ □ = ____ ⬠ = ____	◯ = ____ □ = ____ ⬠ = ____

Red Team Total Score _____ Blue Team Total Score _____

NAME _____ **DATE** _____

Algebra Puzzles Game 2

Red Team _____ Blue Team _____

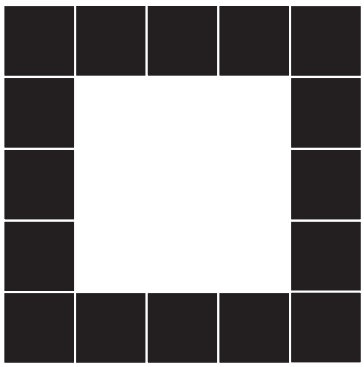
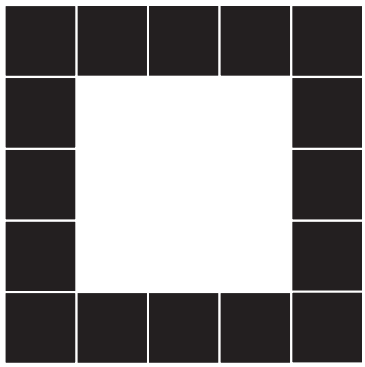
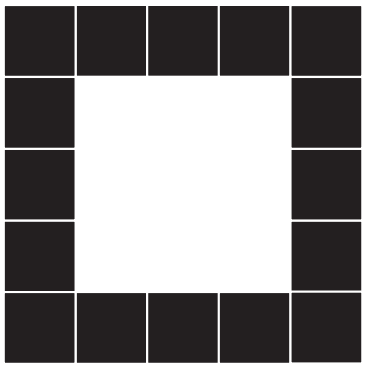
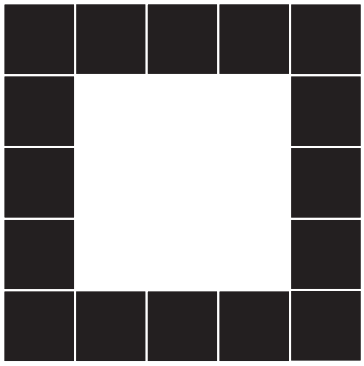
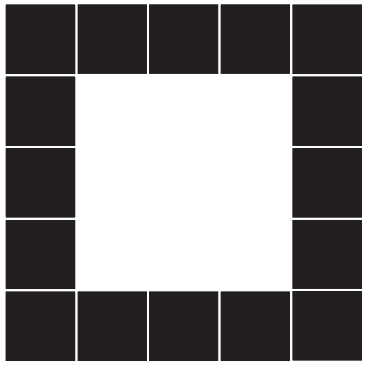
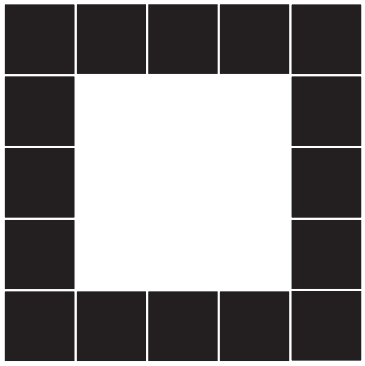
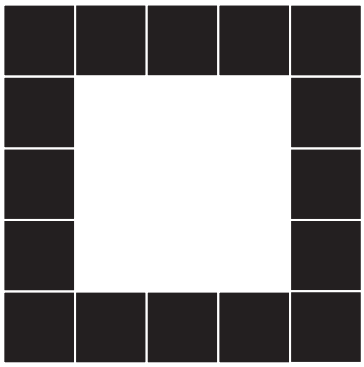
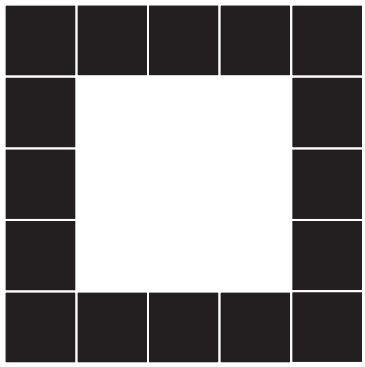
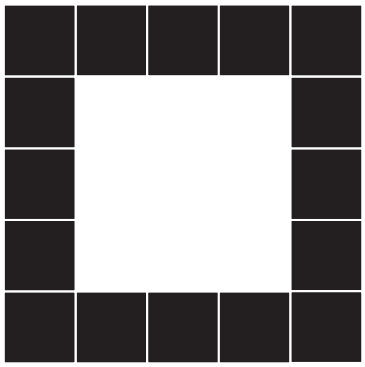
1 A + ____ = ____ A ÷ B = ____ (A + B) – C = ____	**2** A × ____ = ____ A + B = ____ (B – A) ÷ C = ____
A = _____ B = _____ C = _____	A = _____ B = _____ C = _____
3 A ÷ ____ = ____ A – B = ____ (A + B) ÷ C = ____	**4** ____ – A = ____ A ÷ B = ____ (A – B) ÷ C = ____
A = _____ B = _____ C = _____	A = _____ B = _____ C = _____

Red Team Total Score _____ Blue Team Total Score _____

NAME _____ **DATE** _____

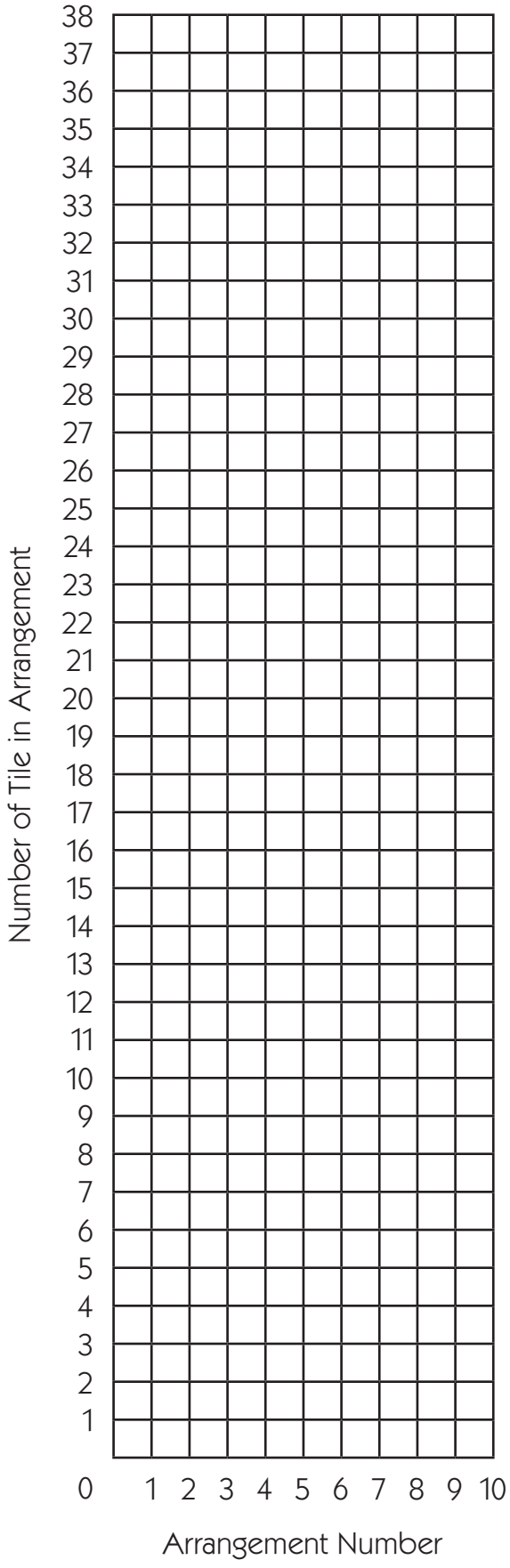
How Many Different Ways?

How many different ways can you count the tile in this arrangement? Loop the tile to show how you're counting them and write an equation to match.

NAME _____ **DATE** _____

Pattern Graph



NAME _____ **DATE** _____

Tile Sequence 2 page 1 of 3

Arrangement 1 Arrangement 2 Arrangement 3 Arrangement 4 Arrangement 5

1 Write at least four mathematical observations about the three arrangements above. Think about how they are alike, how they are different, and how each one of them matches their arrangement number. Draw loops if it helps.

2 Sketch the 1st and 4th arrangements where they belong in the sequence above.

3 Sketch the 6th arrangement below. (See if you can figure out a way to make a quick sketch instead of drawing every tile.)

NAME _____ **DATE** _____

Tile Sequence 2 page 2 of 3

4a How many tile would be in the 10th arrangement?

b How many tile would be in the 100th arrangement?

c Use numbers, words, or labeled sketches to show how you got your answers.

5 What do you have to do to figure out how many tile are in *any* arrangement (or the *n*th arrangement) in this sequence? You can write an expression using *n* or explain your thinking in words. Make a labeled sketch of the *n*th arrangement to show how you got your answer.

NAME _____ **DATE** _____

Tile Sequence 2 page 3 of 3

6 Fill in the values for each arrangement number on this table. How do the numbers change from one arrangement to the next for the first 6 arrangements?

Arrangement Number	Tile
1	
2	
3	
4	
5	
6	
CHALLENGE	
10	
100	
n	

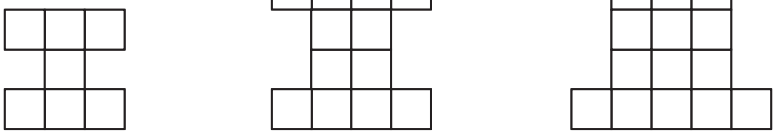
7 Graph the sequence on the same sheet you graphed Tile Sequence 1. Be sure to use a different color and make a key to show which sequence is which.

This page is meant to be blank.

NAME _____ **DATE** _____

Tile Sequence Challenge Problems page 1 of 2

CHALLENGE



Arrangement 1 Arrangement 2 Arrangement 3

1 In the space below, sketch the 4th and 5th arrangements in the above sequence.

2 How many tile would it take to build the 25th figure in this sequence? Use numbers, words, and/or labeled sketches to explain how you got your answer.

NAME _____ **DATE** _____

Tile Sequence Challenge Problems page 2 of 2

CHALLENGE

3 It takes exactly 124 tile to build a certain arrangement in this sequence. Which arrangement is it? Use numbers, words, and/or labeled sketches to explain how you got your answer.

4 It takes exactly 444 tile to build a certain arrangement in this sequence. Which arrangement is it? Use numbers, words, and/or labeled sketches to explain how you got your answer.

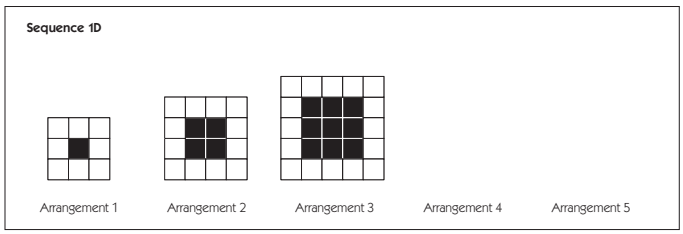
5 What do you have to do to figure out how many tile are in *any* arrangement (or the *n*th arrangement) in this sequence? You can write an expression using *n* or explain your thinking in words. Make a labeled sketch of the *n*th arrangement to show how you got your answer.

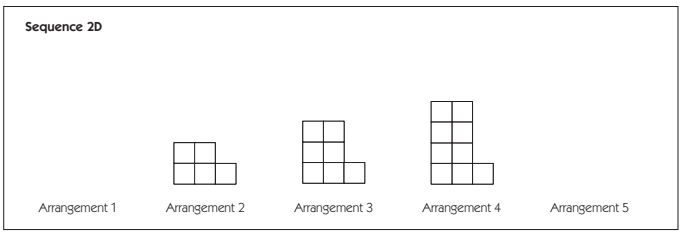
NAME _____ **DATE** _____

Pattern Poster Instructions page 1 of 2

Part 1 Getting Ready/Drafting the Work in Your Journal

1 Get a pair of tile sequences from your teacher. Cut the two sequences apart. Each partner gets one sequence to work on.





2 Complete the following steps in your journal:

***a** Write at least four mathematical observations about the arrangements in your sequence. Think about how they are alike, how they are different, and how each one matches their arrangement number. Draw loops if it helps.

***b** Sketch the missing arrangements on your sequence strip. Sketch the 6th arrangement in your journal.

3 Share your work with your partner and make sure he or she agrees with you so far.

***4** Determine how many tile it would take to build the 10th and the 100th arrangements. In your journal, use numbers, words, or labeled sketches to show how you got your answers.

***5** Determine the number of tile it would take to build any arrangement (or the *n*th arrangement) in your sequence. Make a labeled sketch of the *n*th arrangement in your journal and label it to show how you got your answer.

***6** Make a T-chart in your journal to show how many tile it would take to build the 1st, 2nd, 3rd, 4th, 5th, 6th, 10th, 100th, and *n*th arrangements in the sequence.

7 Explain all your work to your partner. Check each other's work and make sure you agree on everything.

NAME _____ **DATE** _____

Pattern Poster Instructions page 2 of 2

Part 2 Making the Poster

1 Get a piece of 18" × 24" chart paper and a blank Pattern Graph. You'll also need a glue stick, colored pencils or markers, and your tile sequence strips.

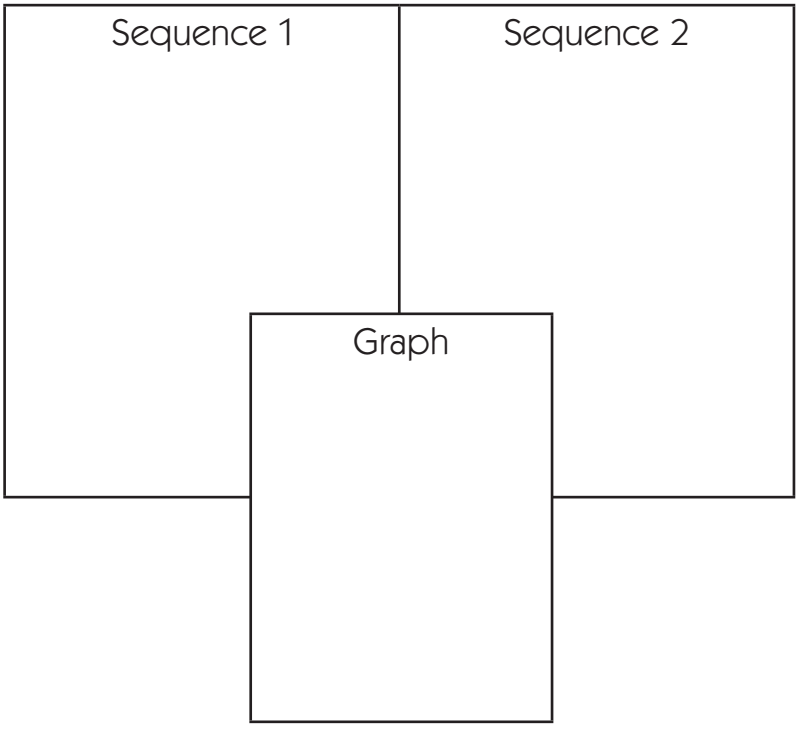
2 Color in any arrangements you added to your tile sequence strip so they really show up well.

3 Fold the chart paper in half and glue your two sequence strips to the top.

4 Transfer all the work you did in your journal to your side of the poster. Be sure to include everything that was marked with an asterisk (*) in the Getting Ready instructions.

5 Make sure your work is neat, colorful, organized, complete, and accurate.

6 Graph your sequence in one color. Have your partner graph his or her sequence on the same graph. Include a key so people know which graph is which. Glue your graph to the bottom of the poster.



NAME _____ **DATE** _____

Anthony's Problem page 1 of 2

Anthony is a junior in high school. He decided to get a job this summer so he could put some money in his college savings account. His goal was to put $1,000 into his account, but still have time to rest up before school started again. He is a very good math student who loves computers, and he was lucky to be offered a summer job with two different software companies.

Company 1 offered to pay Anthony $1 on the first day and double the amount each day. ($1 the first day, $2 the next day, $4 the third day, $8 the fourth day, and so on)

Company 2 offered to pay Anthony $75 every day.

Which job should Anthony accept if he wants to reach his goal of earning $1,000 as quickly as possible?

1 On the next page, fill in the table for each company's payment plan. You can stop as soon as the total amount of money reaches or goes over $1,000 for a plan, and then do the other one.

2 On page 190, graph the running totals for each day. Graph each plan in a different color, and mark the key at the top of the sheet to show which is which.

3 Which company's plan turned out to be best? Why?

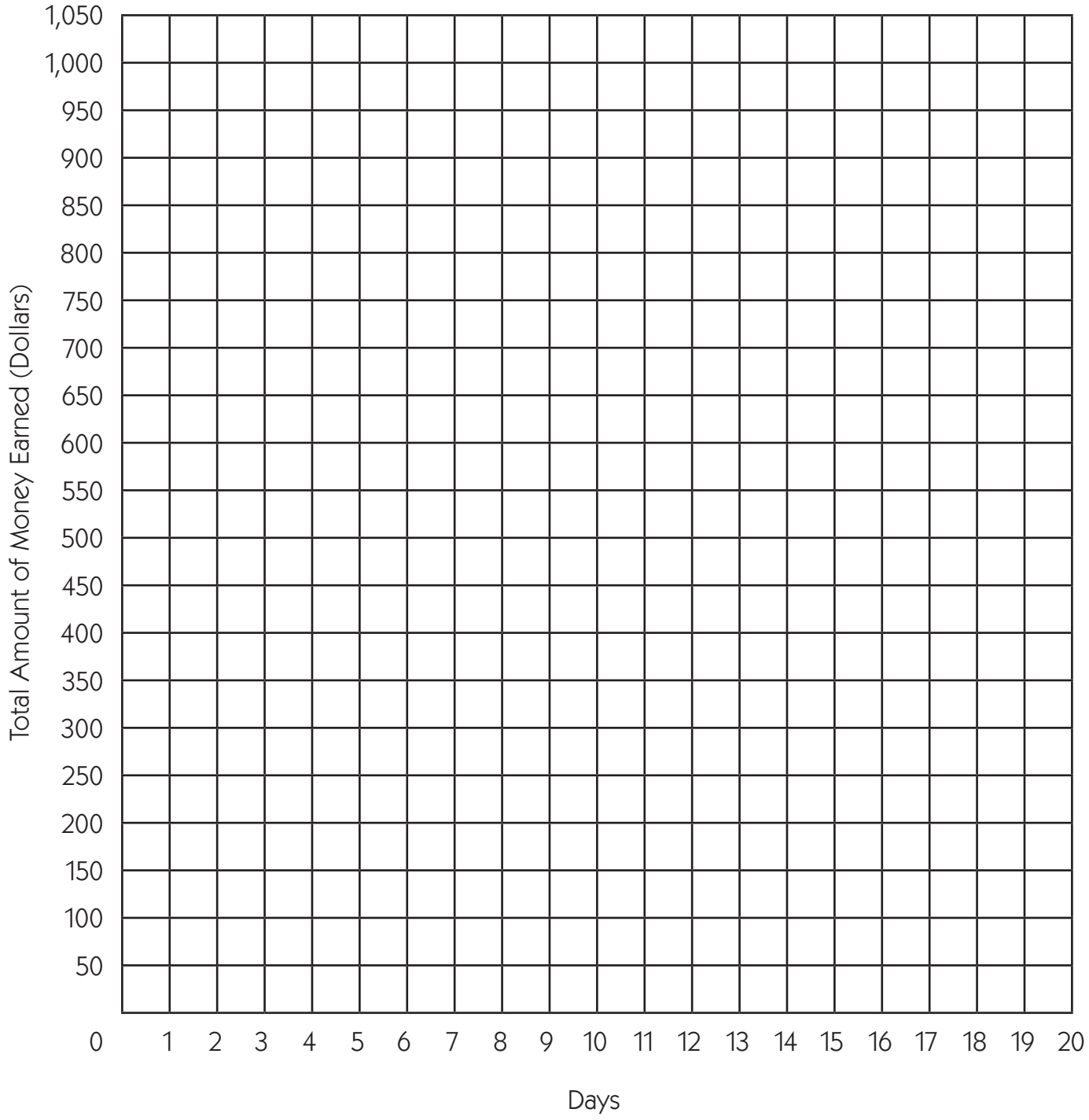
NAME _____ **DATE** _____

Anthony's Problem page 2 of 2

Company 1 Payment Plan			Company 2 Payment Plan		
Day	Daily Amount (Dollars)	Running Total (Dollars)	Day	Daily Amount (Dollars)	Running Total (Dollars)
1	$1		1	$75	
2	$2		2	$75	
3	$4		3	$75	
4	$8		4	$75	
5			5		
6			6		
7			7		
8			8		
9			9		
10			10		
11			11		
12			12		
13			13		
14			14		
15			15		
16			16		
17			17		
18			18		
19			19		
20			20		

NAME _____ **DATE** _____

Graphing the Two Payment Plans



NAME _____ **DATE** _____

Algebra Puzzle Challenge

CHALLENGE

Here are some more algebra puzzles to solve. Even though some of the problems have parentheses, you'll have to pay close attention to the order of operations to get the right answers.

1 $A \div 3 = 7$ $A - B = 10$ $(A + B) \div C = 8$	**2** $84 - A = 60$ $A \div B = 4$ $(A - B) \div C = 9$
A = _____ B = _____ C = _____	A = _____ B = _____ C = _____
3 $15 \times A = 45$ $A \times B = 33$ $(B - A) \times C = 56$ $(A + B + C) \times D = 84$	**4** $A + 14 = 31$ $A \times B = 51$ $(A + B) \div C = 2$ $(B \times C) + A + D = 60$
A = _____ B = _____ C = _____ D = _____	A = _____ B = _____ C = _____ D = _____
5 $132 \div A = 11$ $A + B = 27$ $(A + B) \div C = 3$ $((B + C) \div A) + D = 20$	**6** $A \times A + 8 = 17$ $A \times B = 36$ $B \div A + C = 28$ $A + C \div B + D = 14$
A = _____ B = _____ C = _____ D = _____	A = _____ B = _____ C = _____ D = _____

NAME _____ **DATE** _____

The King's Chessboard page 1 of 2

1 Answer the following questions about measurements used in *The King's Chessboard*.

a How many ounces are in pound?

b How many pounds are in a ton?

c The second day the king was away on a hunting trip, the Grand Superintendent had to send the wise man 16 sacks of rice. Each sack weighed 128 pounds. How many pounds was that in all? Show your work here and don't use a calculator.

16 sacks of rice weighs _____ pounds.

2 In this story, the king was furious when he found out he would have to give the wise man 274,877,906,944 tons of rice to keep his promise. Below are some other very large numbers. Complete the chart below to write and name some other very large numbers.

Number	Number Name Written Out in Words
345,786,221,543	three hundred forty-five billion, seven hundred eighty-six million, two hundred twenty-one thousand, five hundred forty-three
	four hundred seventy-one billion, eight hundred ninety-two million, three hundred forty-seven thousand, six hundred fifty-two
56,713,456,102	
5,312,029,004	
	two hundred billion, four hundred twenty-six million, three hundred fifty-seven thousand, six

NAME _____ **DATE** _____

The King's Chessboard page 2 of 2

3 Using tile, make a pattern that matches the doubling pattern in *The King's Chessboard*. Draw the first 5 arrangements below.

4 Suppose the king was as wise as the wise man and responded to his request by saying: "I like your idea for a gift, but using a chessboard with 64 squares will be too much rice. I would rather use a board with _____ squares." Choose a number to go in the blank above. Explain the reasons for your choice here.

NAME _____ **DATE** _____

More Situations to Model page 1 of 2

1 Draw a model of a rectangle that is 3 times as long as it is wide.

2 A rectangle is 3 times as long as it is wide. If its short side measures 27 cm, what is the measure of its long side? Explain your answer below with a labeled sketch, numbers, *and* words.

The long side measures _____ cm.

3 A rectangle is 3 times as long as it is wide. If its long side measures 60 inches, what is the measure of its short side? Explain your answer with a labeled sketch, numbers, *and* words.

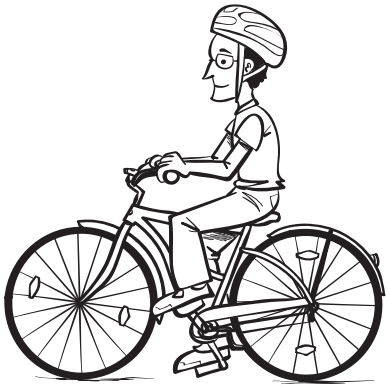
The short side measures _____ inches.

NAME _____ **DATE** _____

More Situations to Model page 2 of 2

4 A delivery truck travels a rectangular path that is a total of 120 kilometers. Yesterday morning, the truck's rectangular path was 3 times as long as it was wide. Draw the truck's path below. Label the path to show how many kilometers long it was and how many kilometers wide.

5 Every Sunday a math teacher bicycles 42 kilometers and always chooses a rectangular path. Last Sunday, his rectangular path was twice as long as it was wide. Draw the math teacher's path below. Label the path to show how many kilometers long it was and how many kilometers wide.



NAME _____ **DATE** _____

Situations Challenge Sheet

CHALLENGE

1 The perimeter of square A is 24 linear units. The area of square A is 4 times the area of square B. What is the perimeter of square B? Make a labeled sketch to solve the problem. Use words and numbers to explain your answer.

2 A rectangle has a perimeter of 60 inches. The length of the retangle is 2 inches more than 3 times its width. What are the dimensions of the rectangle? Make a labeled sketch to solve the problem. Use words and numbers to explain your answer.

NAME _____ **DATE** _____

Secret Number Problems

Solve each problem below. Use words, numbers, and a labeled sketch of the model you used to find each answer.

1 There are 3 secret numbers. The first number is twice the second number. The third number is three times the first number. The sum of the 3 numbers is 72. Show the numbers with stirrers and units, and then figure out what each number is.

2 Every Saturday, a 5th grade teacher bicycles a total of 48 kilometers and always chooses a rectangular path. One morning, her rectangular path was 4 kilometers longer than it was wide. Show her path with stirrers and units, and then figure out how long and wide the path was.

3 Two consecutive counting numbers add up to 31. Show the numbers with stirrers and units, and then figure out what each number is. (Remember that consecutive counting numbers come one right after the other.)

NAME _____ **DATE** _____

More Secret Number Problems

For each problem below:

- Sketch a picture that models the situation.
- Use your sketch to help determine the secret numbers.
- Use words, numbers, and/or your labeled sketch to show you got your answers.

1 The sum of two secret numbers is 40. Their difference is 14. What are the two secret numbers?

2 Three consecutive odd secret numbers add up to 75. What are the three secret numbers?

3 One secret number is 7 more than another number. If the two numbers are added together, the result is 29. What are the two secret numbers?

YOUR NAME _____ **DATE** _____

PARTNER'S NAME _____

Making Story Problem Posters

Poster Instructions

1 Choose two story problems from the list below to solve. Use labeled sketches, words, and numbers to solve both problems in your math journal.

2 When you are finished, share your work with the teacher or another pair of students to make sure it is clear. Revise your work as needed and then make a poster of just one of the problems you just solved (not both).

3 Your poster should include the following:

a the story problem

b a neatly drawn, well-labeled copy of the sketch you used to solve the problem

c your solution with a detailed explanation of your work

The Story Problems

1 The difference between two secret numbers is 3. The numbers add up to 29. What are the two numbers?

2 Devi has two pieces of rope. One is 15 meters longer than the other, but if you put them together they measure 63 meters. How long is each piece of rope?

3 There are 23 more girls than boys at King School. There are 435 students in the school. How many girls and how many boys are there?

4 Max cut a piece of string 43 inches long into two parts so that one part is 4 inches longer than twice the other part. How long is each part?

5 A certain triangle has a perimeter of 43 inches. The second side of the triangle is 4 inches longer than the first side, and the third side is 5 inches longer than the second. How long is each side of the triangle?

6 A certain triangle has a perimeter of 35 inches. The length of side A is twice the length of side B. Side C is 5 inches longer than side A. How long is each side of the triangle?

NAME _____ **DATE** _____

Mathography 2

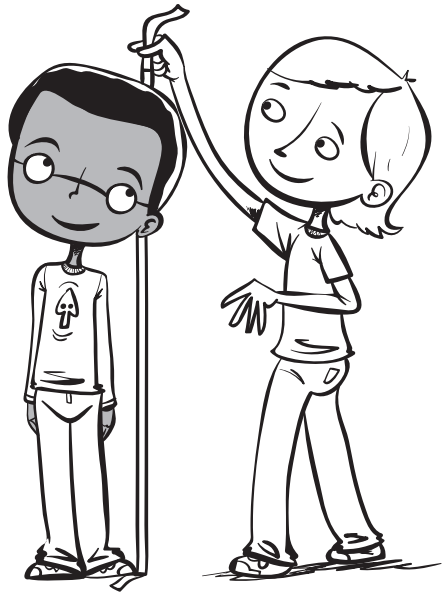
1 What is mathematics?

2 How do you feel about math?

3 Look at the Mathography you filled out at the beginning of the year. Are the same things easy or difficult for you? Did you achieve your goals? How have you grown in math this year? (Consider your feelings and attitudes about math as well as the things you've learned to do.) You can write on the back of this page if you need more room.

NAME _____ **DATE** _____

Year End Height Measurement page 1 of 2



1 Get a long piece of string. Mark a point on the string a few inches away from the end.

2 Step on the string so that the mark is on the floor and you can see it just next to your shoe.

3 Have your partner lift the string so that it lines up with the top of your head and make a second mark there. The difference between the marks should be equal to your height!

4 Now measure your partner in the same way. Be sure to use his or her string.

5 Use a yardstick to measure the length between the two marks on your string in inches. Record the results below.

	Current Height	Start of Year Height
Partner 1	inches	inches
Partner 2	inches	inches

6 Use a meter stick to measure the length between the two marks on your string in centimeters. Record the results below.

	Current Height	Start of Year Height
Partner 1	centimeters	centimeters
Partner 2	centimeters	centimeters

NAME _____ **DATE** _____

Year End Height Measurement page 2 of 2

7 Determine how much each partner has grown in inches and in centimeters. Show your work, and record the changes on the lines below.

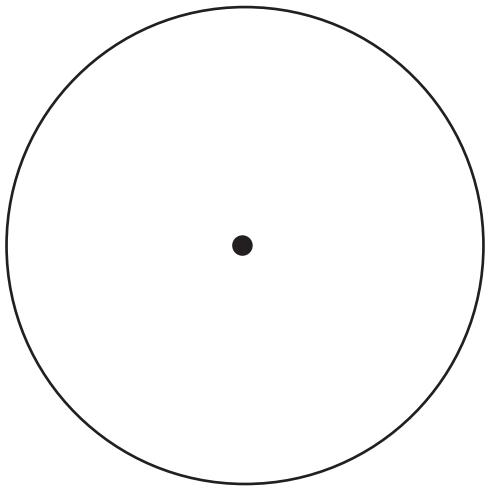
	Inches this Year	Centimeters this Year
Partner 1 has grown		
Partner 2 has grown		

NAME _____ **DATE** _____

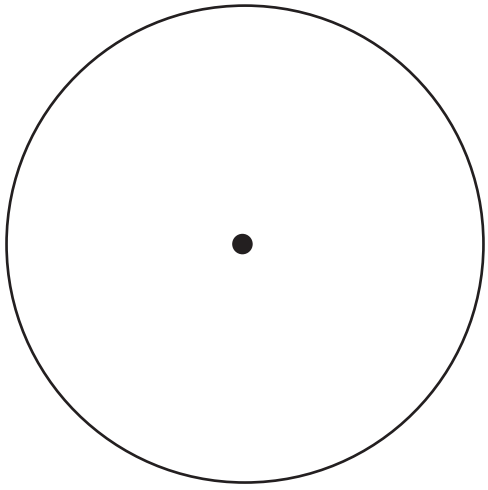
Circles & Angles

What do you remember about circles and angles? Use the first circle to show and label the parts of a circle. Use the second circle to show and label some different kinds of angles. Use the space outside the circles to add more information.

The Parts of a Circle



Kinds of Angles



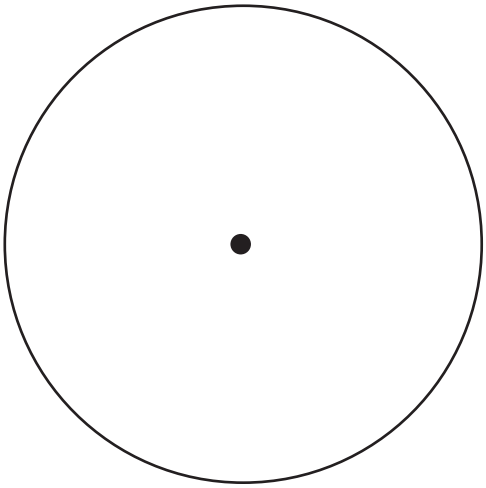
NAME _____ **DATE** _____

Angles in Circles

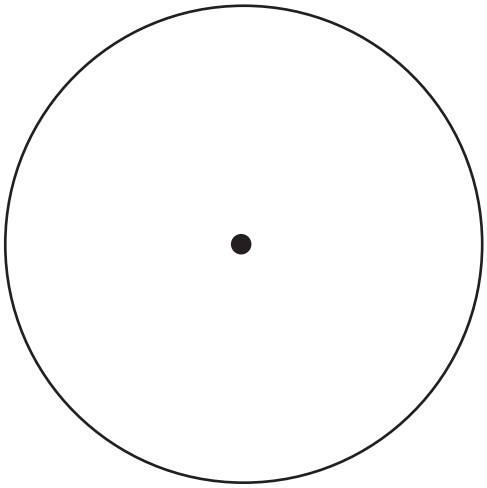
In each circle below, trace one pattern block of your choice. Use the center of the circle as the vertex of one of the angles in the block. (Make sure you pick a pattern block that has the kind of angle you need for each circle.)

Keep rotating the block around the center of the circle and tracing it until you have covered all 360 degrees in the circle. Be sure to keep using the same angle on the block until you've finished with the circle.

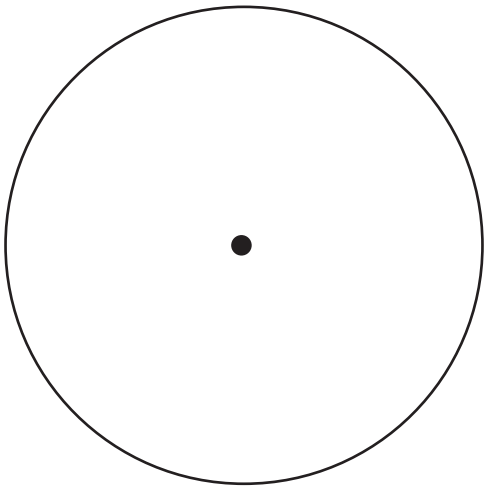
Use an acute angle.



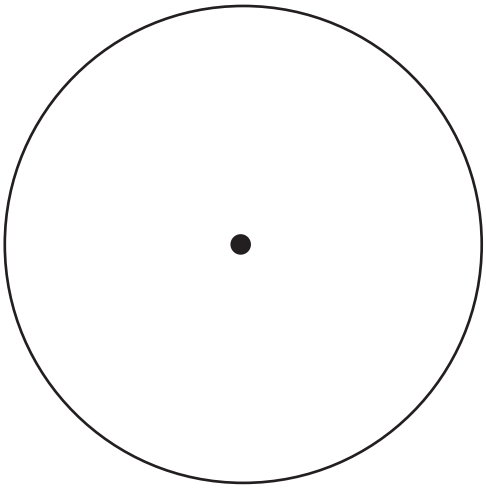
Use an acute angle.



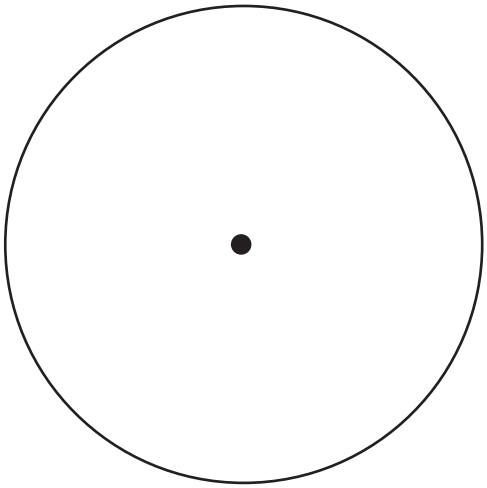
Use a right angle.



Use an obtuse angle.



Use an obtuse angle.



NAME _____ **DATE** _____

Making a Spinning Top page 1 of 2

You'll need

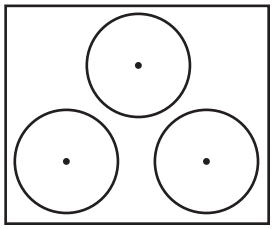
- a drawing compass
- a pushpin
- a nail
- a well-sharpened short pencil for the axle of the top
- 1 sheet of tag board
- scissors
- glue stick*
- white glue*
- a toothpick or paperclip unfolded at one end
- a piece of scratch paper
- a regular pencil
- a ruler

***Important Note** Use your glue stick for everything except attaching the spinner top to the pencil at the very end. Otherwise, your top will be too wet.

Directions for Making a Spinning Top

1 Decide on a radius of 4, 5, or 6 centimeters for your top.

2 Use your compass to draw 3 circles of the same radius on your sheet of tag board. Push the pin or the compass point down firmly so the center of each circle will be easy to locate. If you're using a regular compass instead of the one you made, use a ruler to set the radius, and check it again before you draw each circle.



3 Cut out the 3 circles. Then press the pushpin all the way through the center of each circle and rotate it a few times.

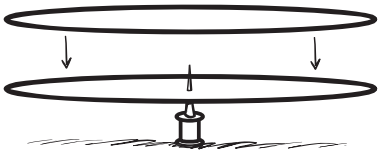
4 Choose one circle and draw a good-sized X on the front and the back of it.

5 Your top is like a sandwich. The circle with the X on each side is going to be the filling. Lay this circle on a sheet of scratch paper and use your glue stick to apply glue evenly over the entire surface of one side. Glue right up to and over the edge of the circle. The scratch paper underneath will keep your table or desktop clean.

(Continued on back.)

Making a Spinning Top page 2 of 2

6 Push the pushpin through the center of the side of the "filling" circle that does not have glue on it and then push the pin through one of the other circles. The pin will help keep the two circles exactly lined up over each other.



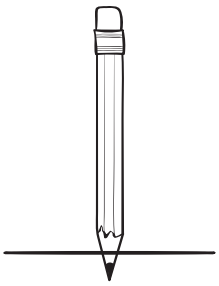
7 Remove the pushpin, set the circles you just glued together on a clean spot on your table, and press and smooth them down with firm pressure.

8 Now take this 2-layered circle and turn it over so the side with the X is facing up. Lay it on a clean space on the scratch paper.

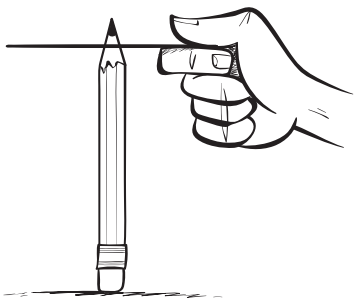
9 Repeat steps 5 through 7 to attach the other circle.

10 Put the tip of the nail through the center of your 3-layered disk. Turn it gently and patiently until you've made a nice, smooth hole in the disk. Try not to bend the disk as you work. (It helps if you put your fingers under the disk on either side of the nail as you're pushing it through.)

11 Now put the point of the pencil you're going to use for the axle through the center of your disk. Turn it *gently and patiently* until it's about 1 centimeter past the very tip of the pencil. Try not to bend the disk as you work. Then take the disk off the pencil and label the bottom with your name and the radius of the disk.



12 Put a good-sized drop of white glue on a scrap of tag board and use a toothpick or the unfolded end of a paperclip to smear the inside of the hole with glue. Then put the disk back on the pencil. Turn the top upside down and adjust the disk so it's as level as possible. Press it down gently for 60 seconds until the glue dries.



13 Try spinning your top. If one side or the other seems to drag, adjust the disk so it's more level. You can also push the disk a tiny bit further up the pencil, but no more than a couple of millimeters. Do NOT push the disk up onto the painted part of the pencil. Keep working with it until you get it to spin as well as you can.

NAME _____ **DATE** _____

Observations & Conjectures about Spinning Tops

1 In the space below describe your top's behavior through an entire spinning cycle.

- What does the top do when you first launch it?
- What changes do you see as the spin keeps going?
- How do you know when the top is about to topple over onto the table?
- When does the top finally stop moving?

2 Make sure that everyone in your group of 3 or 4 has made a top that is a little different from the others in your group. Now spin your tops all at the same time and compare how they work. (If you can't all launch them at the same time, spin them one by one and time them by counting slowly together to see how long each one spins.) Do some tops almost always spin longer than others? What is it about those tops that might be making them spin longer? Record your ideas below.

Attributes I think may affect how long a top spins:

NAME _____ **DATE** _____

Exploring Tops

1 Enter the information about the top you made last session in the first row of the chart below.

2 Make two more tops. Follow the instructions on pages 211 and 212, but try changing the radius, tip length, and/or the number of layers of tagboard to see if you can make a top that spins longer.

Advice:

- Don't make the radius of your disk less than 4 centimeters or more than 8 centimeters.
- Don't push the disk up onto the painted part of the pencil.
- Use between 3 and 6 layers of tagboard.

3 Enter the information about your two new tops on the chart.

Top Number	Radius (cm)	Tip Length (cm)	Layers of Tag
1			
2			
3			

4 Which of your three tops spins longest? Why do you think that's so?

5 Did you make any other changes that seemed to help your tops spin longer? If so, what were they?

NAME _____ **DATE** _____

Experiment 1 Record Sheet page 1 of 3

1 Ask a question:

2 Describe your hypothesis. What do you think will happen and why?

3 Define the variables: Use a highlighter pen or some other method to show the one variable you're changing today.

Variable	Top A Specifications	Top B Specifications
Radius		
Tip Length		
Layers in Disk		

4 Collect the Data: Conduct 10 trials for each top and record the duration of each spin below.

Trial Number	Top A Duration of Spins in Seconds	Top B Duration of Spins in Seconds
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

Experiment 1 Record Sheet page 2 of 3

5 Organize and Analyze the Data: List the results and use them to find the range, mode, median, and mean spin time for each top.

a Values for Top A (list all 10 spin durations in order below):

Range _____ Mode _____ Median _____ Mean _____

b Values for Top B (list all 10 spin durations in order below):

Range _____ Mode _____ Median _____ Mean _____

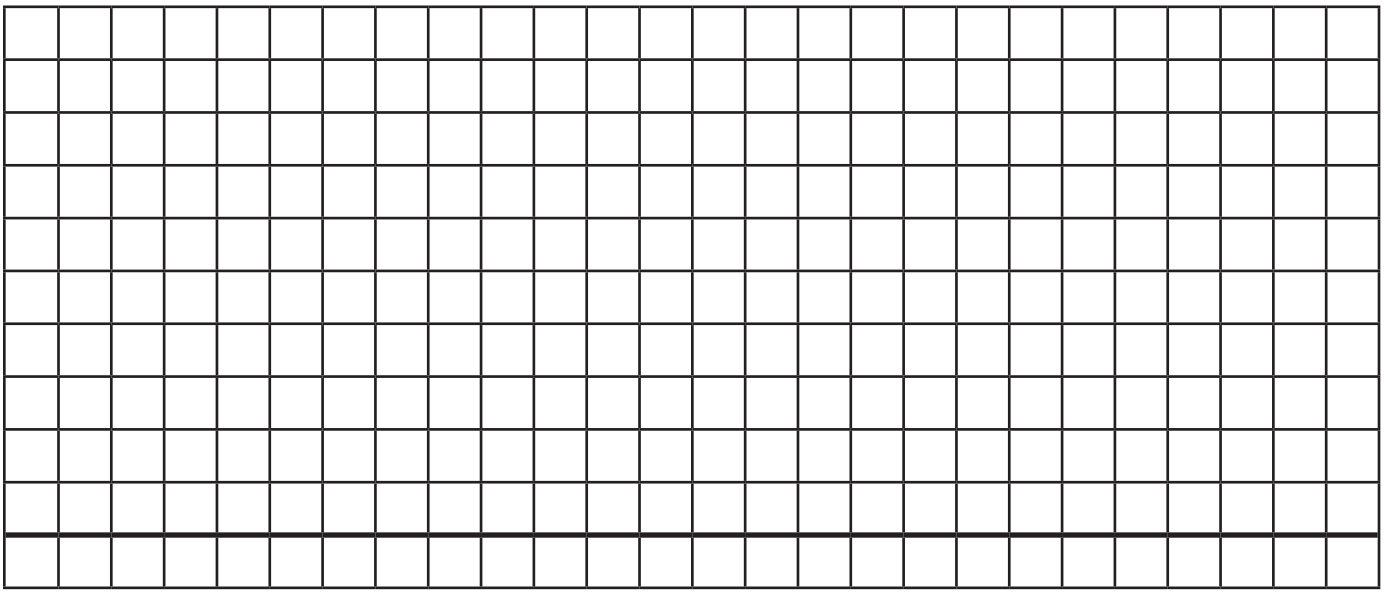
6 Use the grid below to make a line plot of the data for both tops.

a Label your line plot along the side and the bottom.

b Number it to fit your data.

c Give your line plot a title and make a key to show which top is which.

_____



Key

NAME _____ **DATE** _____

Experiment 1 Record Sheet page 3 of 3

7 Does your data support your hypothesis?

8 What conclusion can you make about this experiment? Describe a possible explanation for your results.

YOUR NAME _____ **DATE** _____

PARTNER'S NAME _____

Experiment 2 Record Sheet page 1 of 3

1 Ask a question:

2 Describe your hypothesis. What do you think will happen and why?

3 Define the variables: Use a highlighter pen or some other method to show the one variable you're changing today.

Variable	Top A Specifications	Top B Specifications
Radius		
Tip Length		
Layers in Disk		

4 Collect the Data: Conduct 10 trials for each top and record the duration of each spin below.

Trial Number	Top A Duration of Spins in Seconds	Top B Duration of Spins in Seconds
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

Experiment 2 Record Sheet page 2 of 3

5 Organize and Analyze the Data: List the results and use them to find the range, mode, median, and mean spin time for each top.

a Values for Top A (list all 10 spin durations in order below):

Range _____ Mode _____ Median _____ Mean _____

b Values for Top B (list all 10 spin durations in order below):

Range _____ Mode _____ Median _____ Mean _____

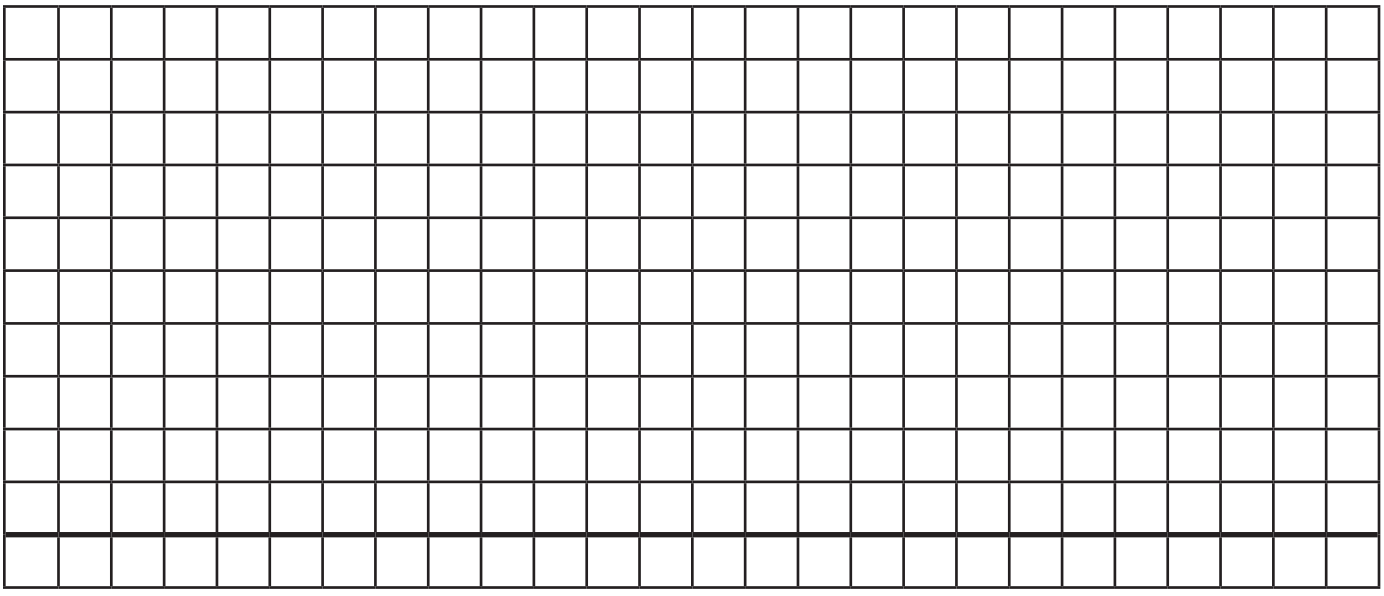
6 Use the grid below to make a line plot of the data for both tops.

a Label your line plot along the side and the bottom.

b Number it to fit your data.

c Give your line plot a title and make a key to show which top is which.

_____



Key	

YOUR NAME _____ **DATE** _____

PARTNER'S NAME _____

Experiment 2 Record Sheet page 3 of 3

7 Does your data support your hypothesis?

8 What conclusion can you make about this experiment? Describe a possible explanation for your results.

NAME _____ **DATE** _____

Colored Top Covers

Choose a fast top with a radius of 5 or 6 centimeters and make removable covers for it out of heavy white drawing paper. Then investigate the interesting patterns made by shapes and colors on a spinning top. Do all drawing and coloring on your top cover circles before you cut them out. These designs are a starting place; you will think of many other possibilities on your own.

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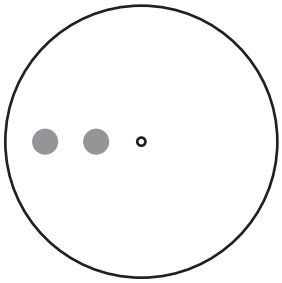
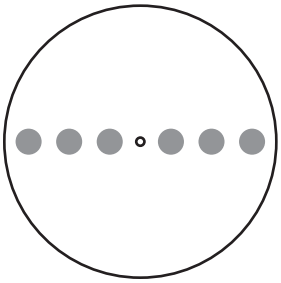
<td>  </td>
<td>Cover Design 1
Use the same color for both dots.</td>
<td>  </td>
<td>Cover Design 2
Use the same color for all 6 dots.</td>
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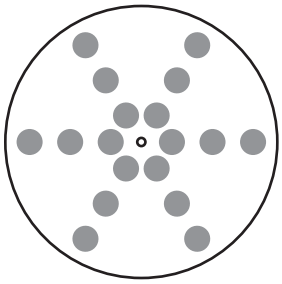
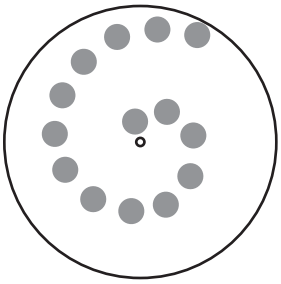
<td>  </td>
<td>Cover Design 3
Use a protractor and light pencil lines to help you distribute the rows of dots (all one color) evenly around the circle.</td>
<td>  </td>
<td>Cover Design 4
Make a spiral of dots all one color. See how it looks when you spin it to the right; then see how it looks when you spin it to the left.</td>
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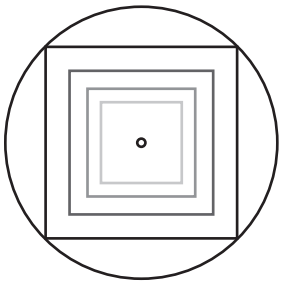
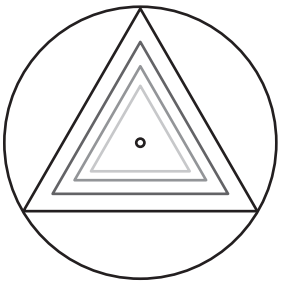
<td>  </td>
<td>Cover Design 5
Use your protractor to divide the circle into 4 equal sections. Then use a different color of pen or pencil to draw each square.</td>
<td>  </td>
<td>Cover Design 6
Use your protractor to divide the circle into 3 equal sections. Then draw each triangle using a different color of pen or pencil.</td>
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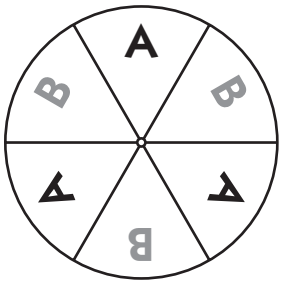
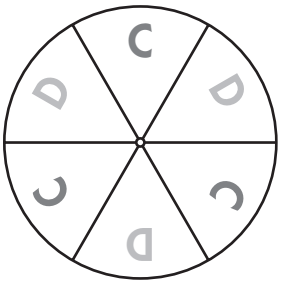
<td> 
</td>
<td>Cover Design 7
Color the A sections one color and color the B sections a different color.</td>
<td> 
</td>
<td>Cover Design 8
Repeat design 7 using two different colors.</td>
</tr>
</table>

NAME _____ **DATE** _____

Black & White Top Covers

Black and white top covers can produce interesting effects. Here are a few experiments to get you started. Then you can invent your own designs.

Step 1 Make an underlayer.

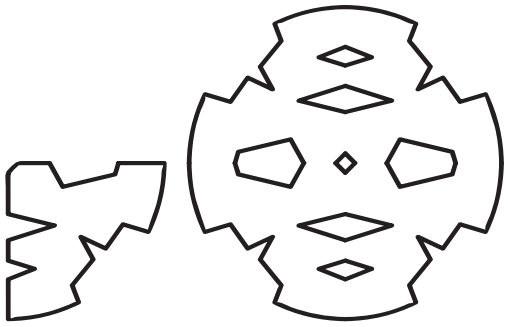
Use your compass to draw a circle having the same radius as your top on black construction paper.

Cut out the black circle.

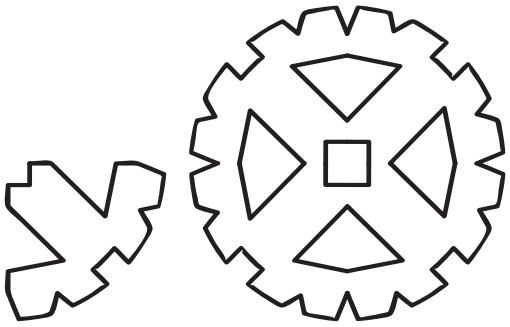
Fold the black circle into fourths and cut a small wedge out of the inside corner so it will fit over your top. This will be the black underlayer for all the white top covers that you cut out.

Step 2 Make some cutout overlayers.

To make an overlayer, draw and cut out a circle from white copy paper. Fold that circle into fourths, or even into eighths. Cut a lot of shapes off the sides and edges of the folded circle. When you unfold and flatten the circle, you will have a white overlayer full of cutouts. Fit this white layer over the black circle on your top and spin. The more black you can have show through, the more interesting effects you will see.



This cut out ... made this cover.



This cut out ... made this cover.

Step 3 Try another style.

These two tops combine cutting out one or more large chunks and then drawing just a few short black line segments or curves on the remaining white paper.