LESSONS / VOLUME 3

BLACKLINE MASTERS

Salem, Oregon

Blackline Index

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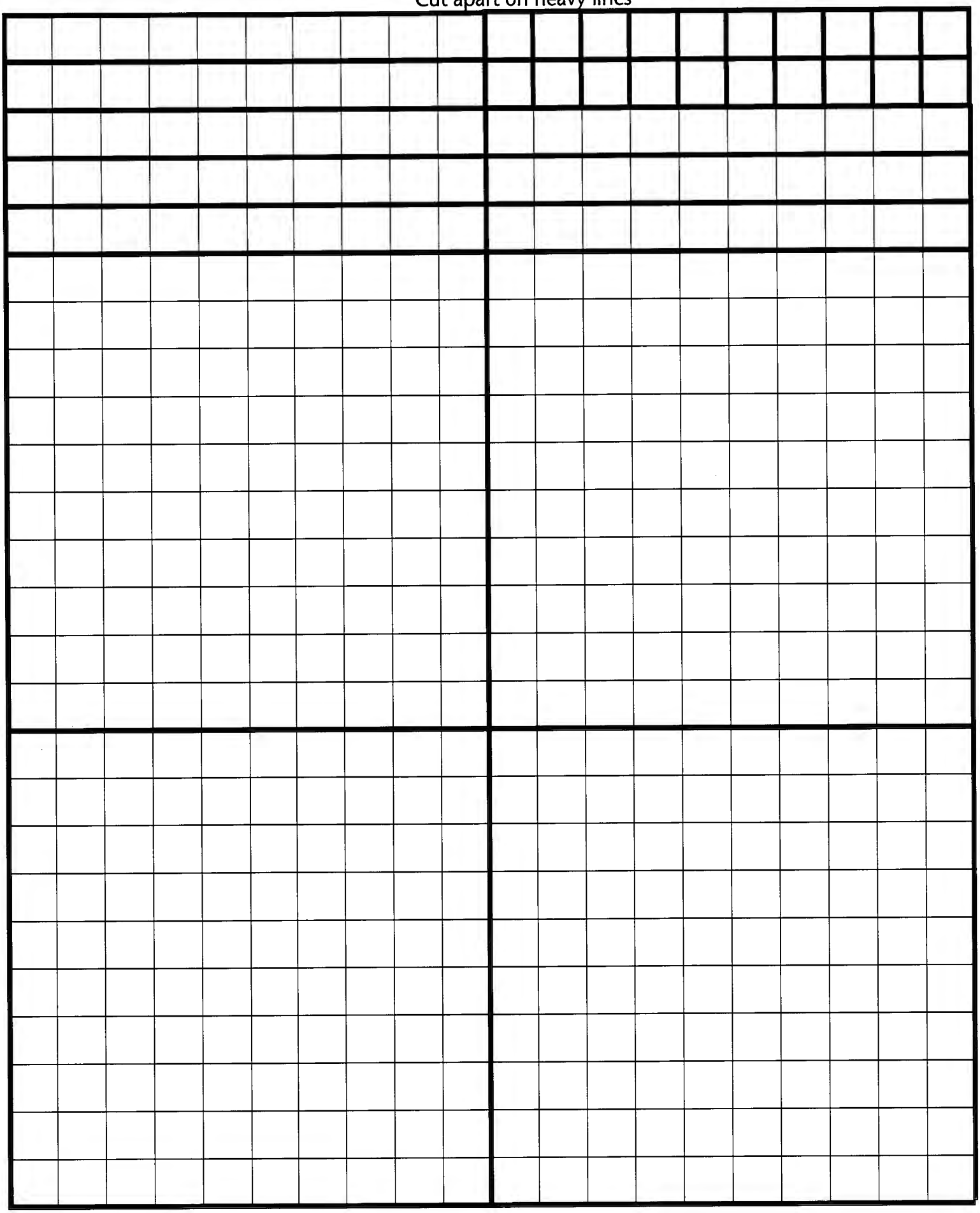
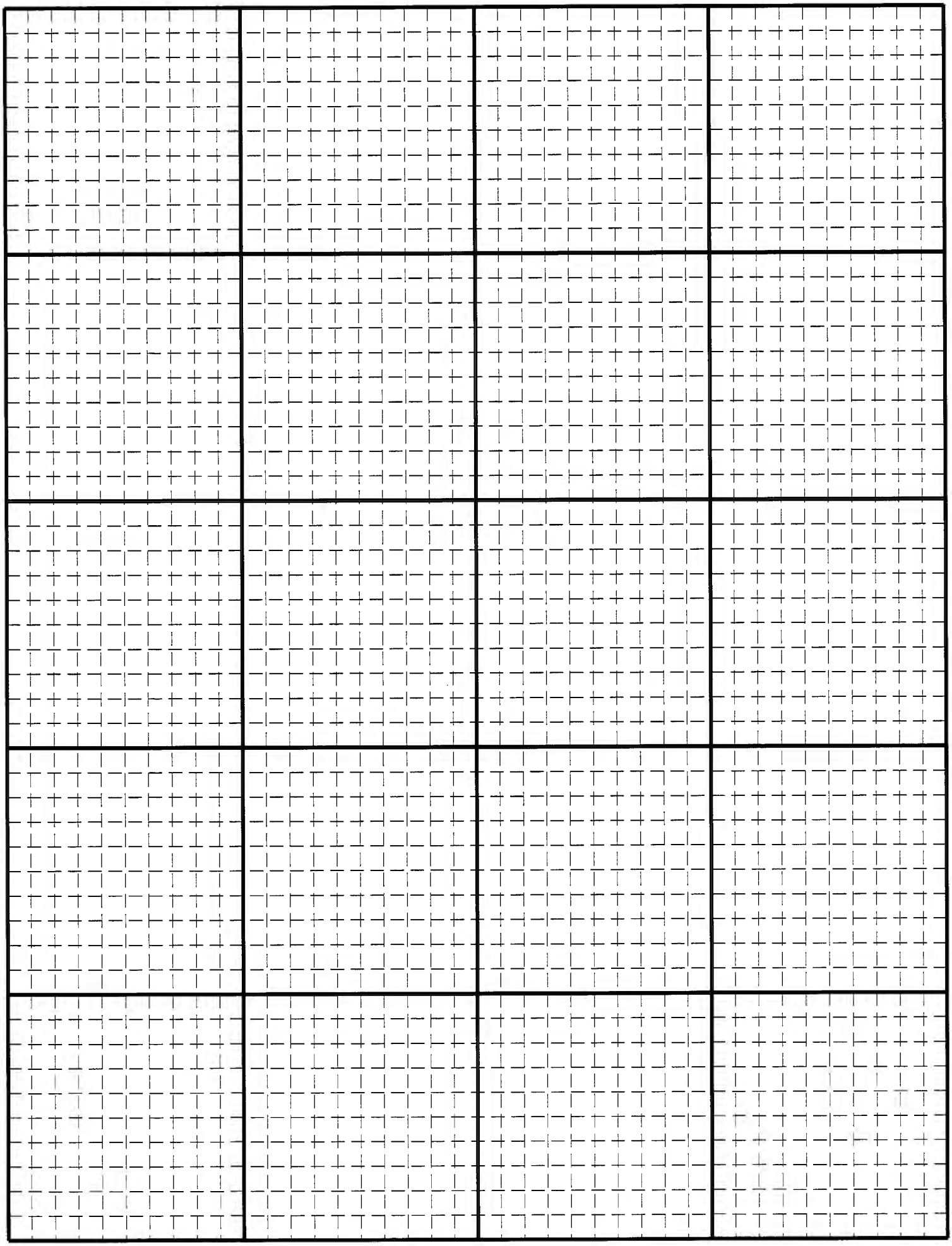
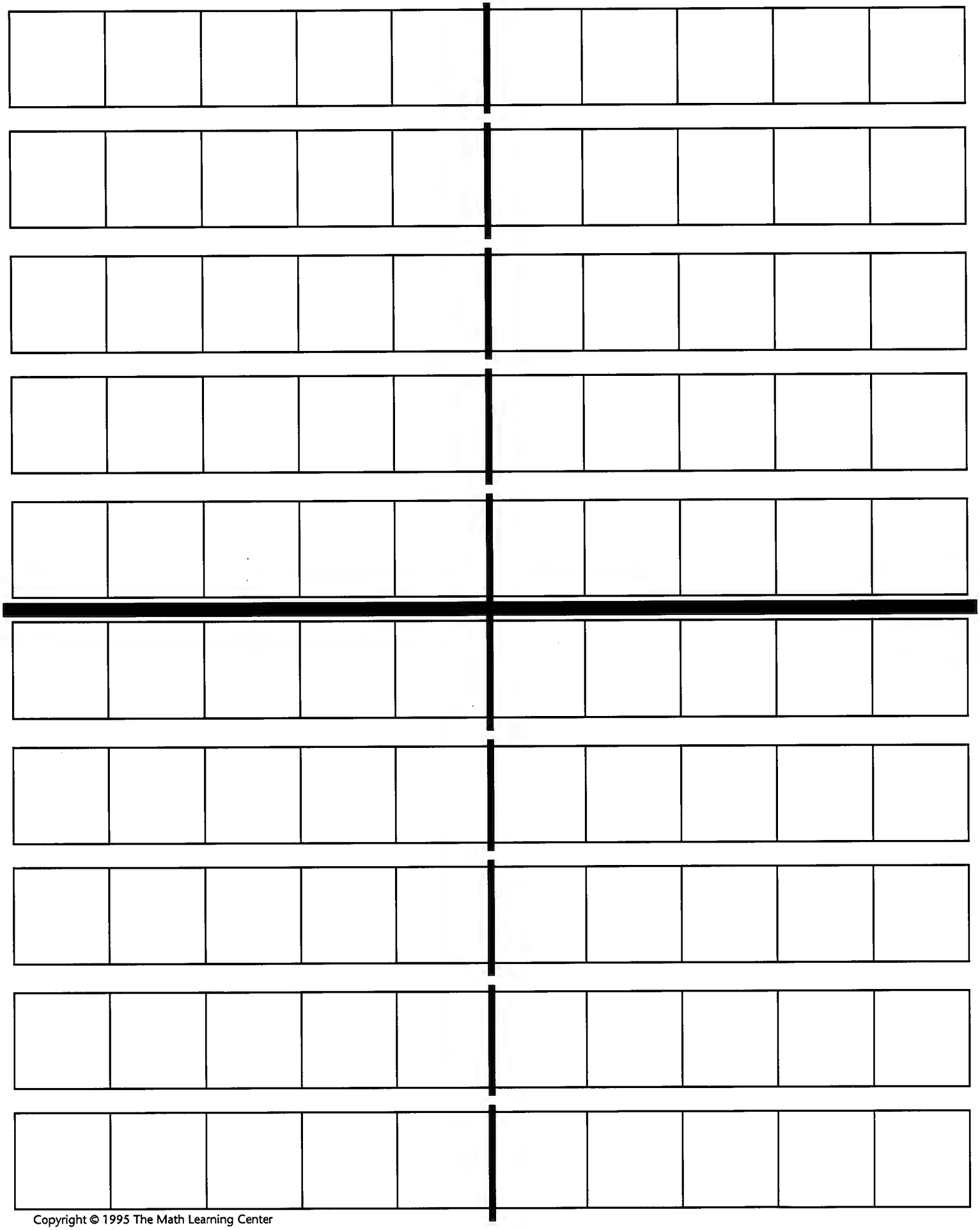
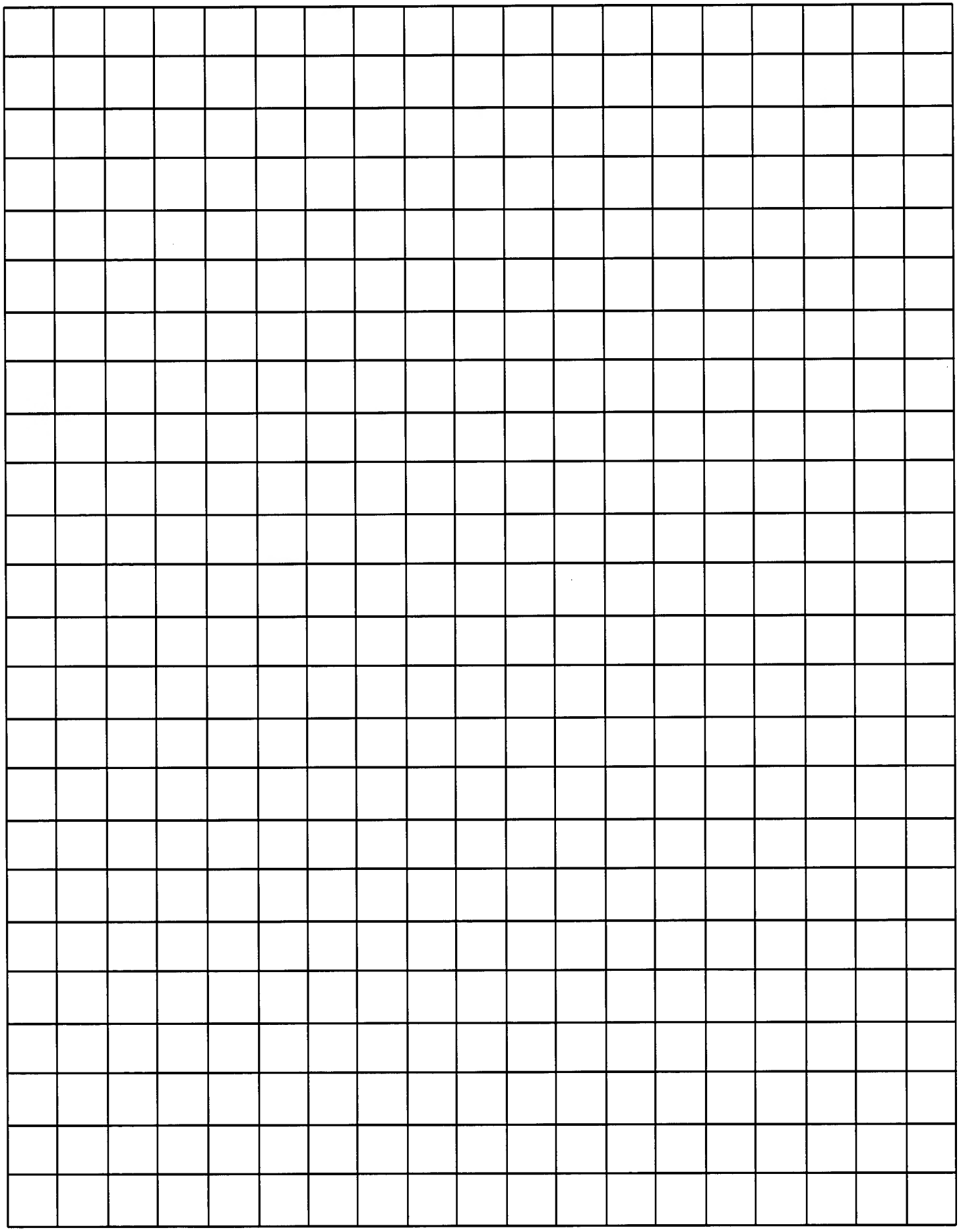
Base Ten Area Pieces
Cut apart on heavy lines

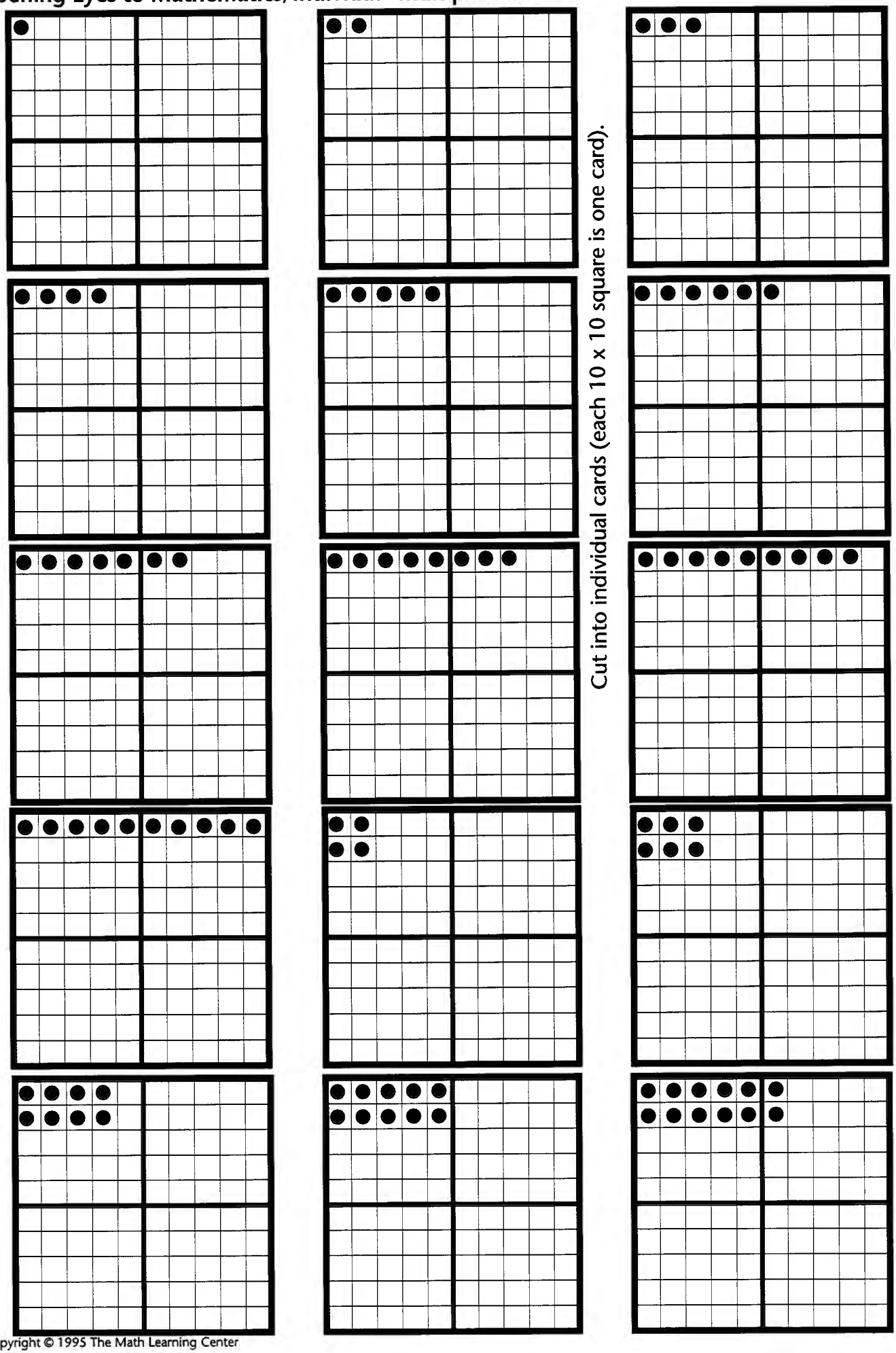




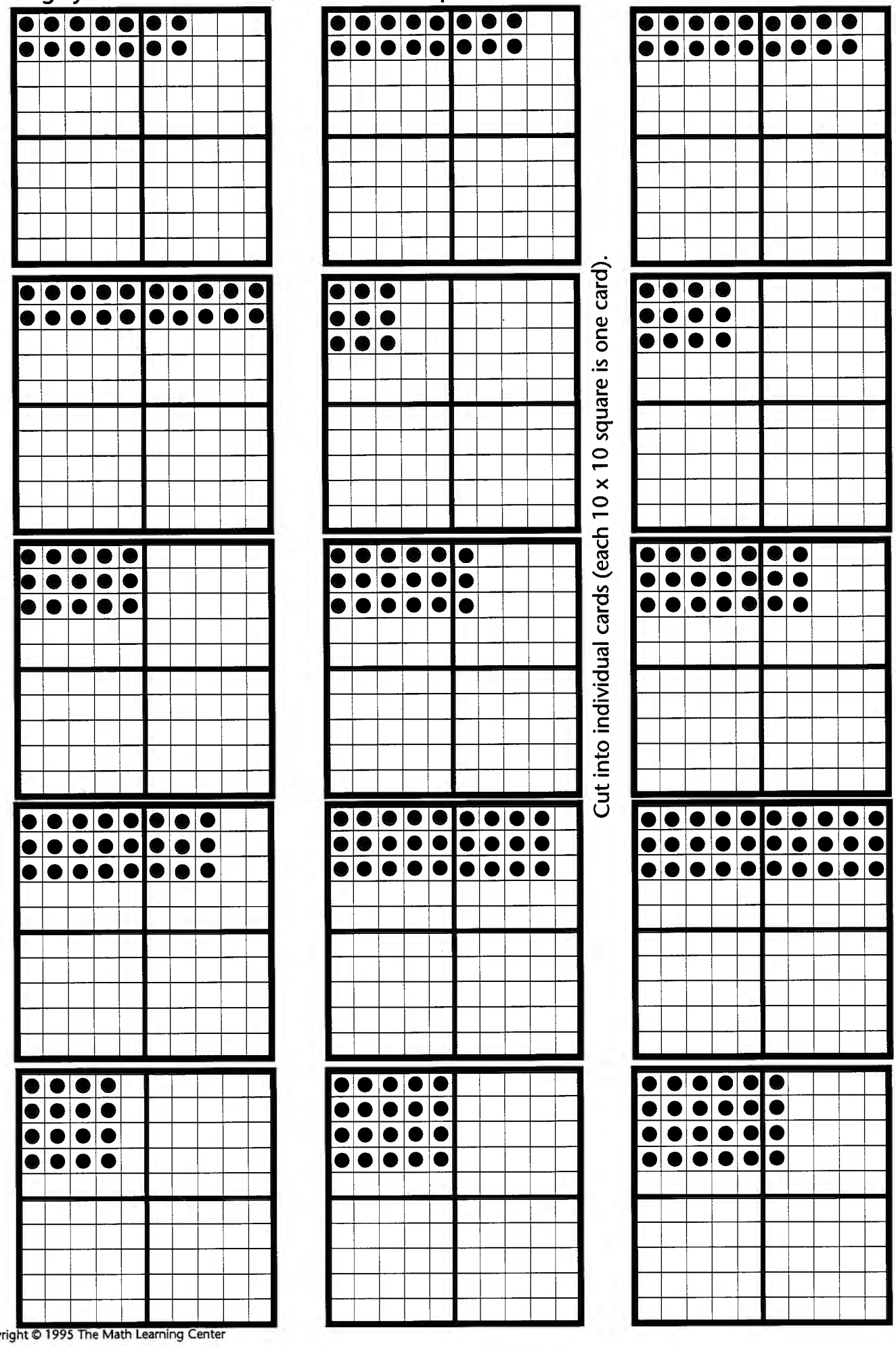
Ten Strip Board







Cut into individual cards (each 10 x 10 square is one card).



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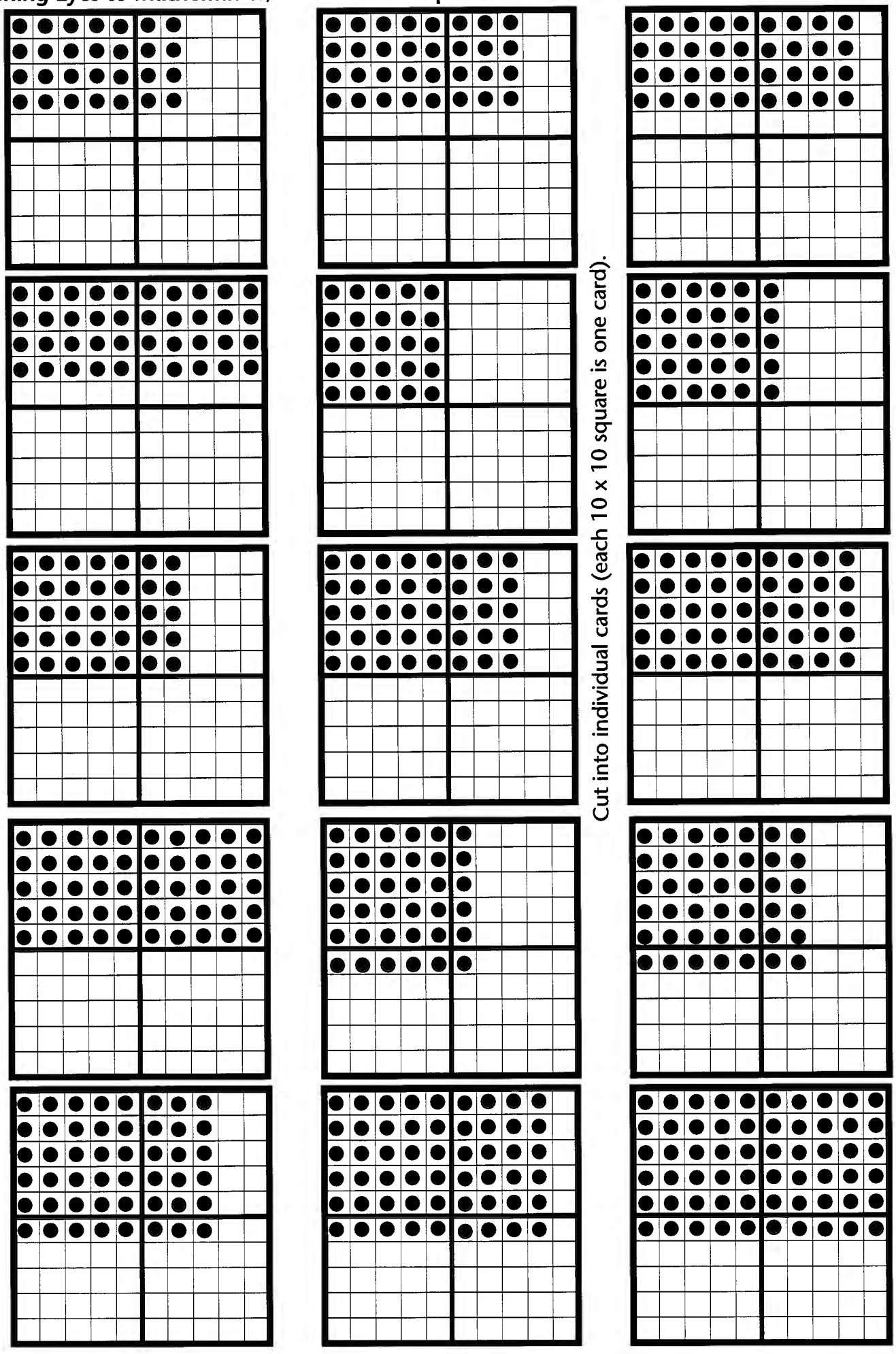

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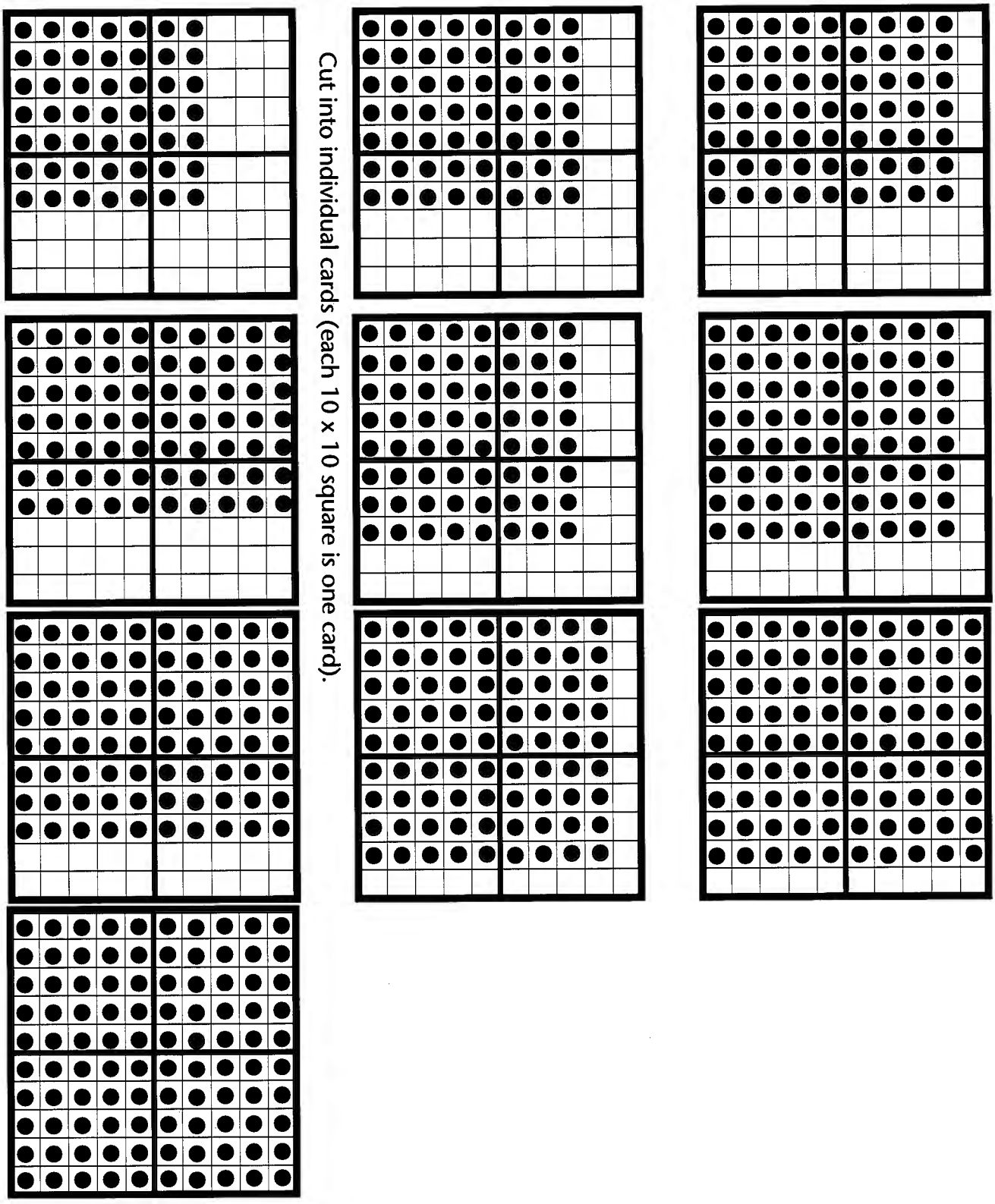

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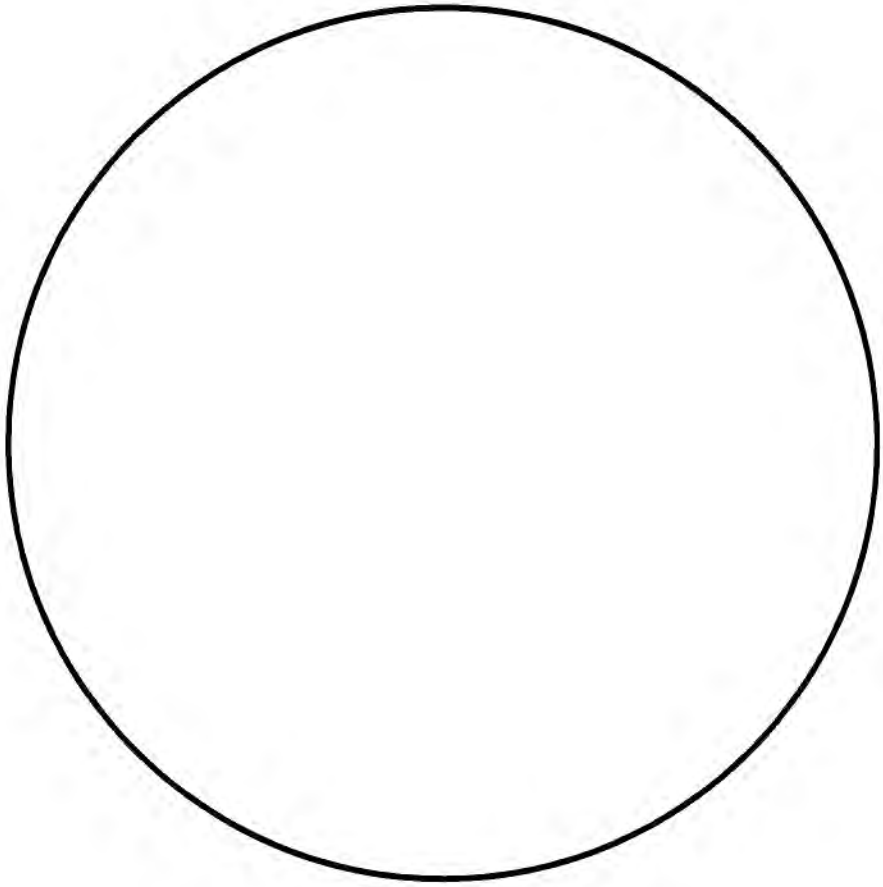

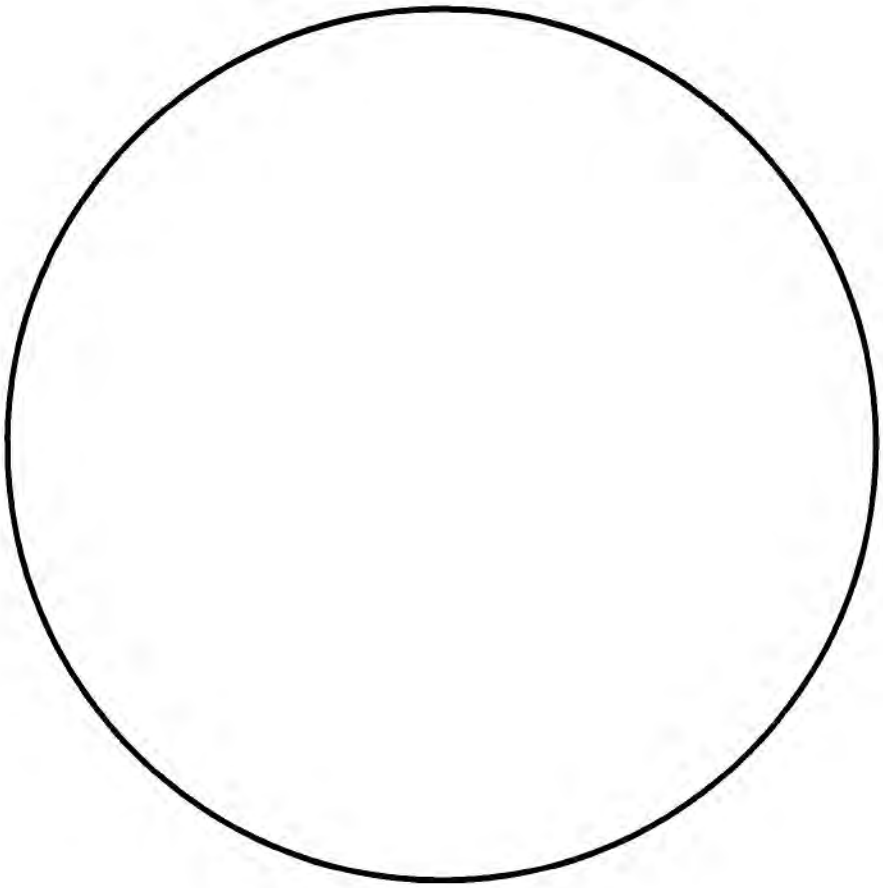

Pattern Block Shapes
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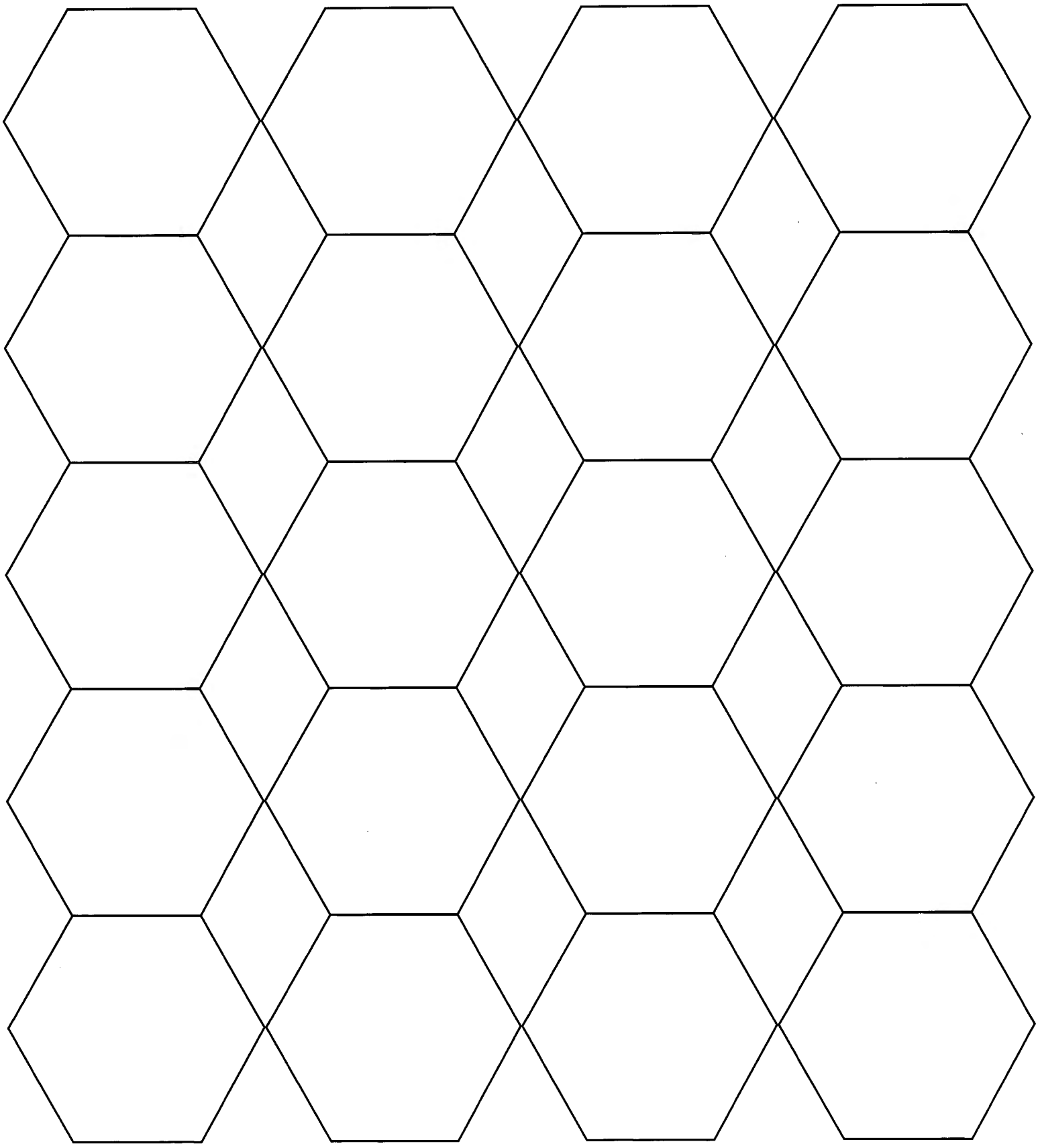
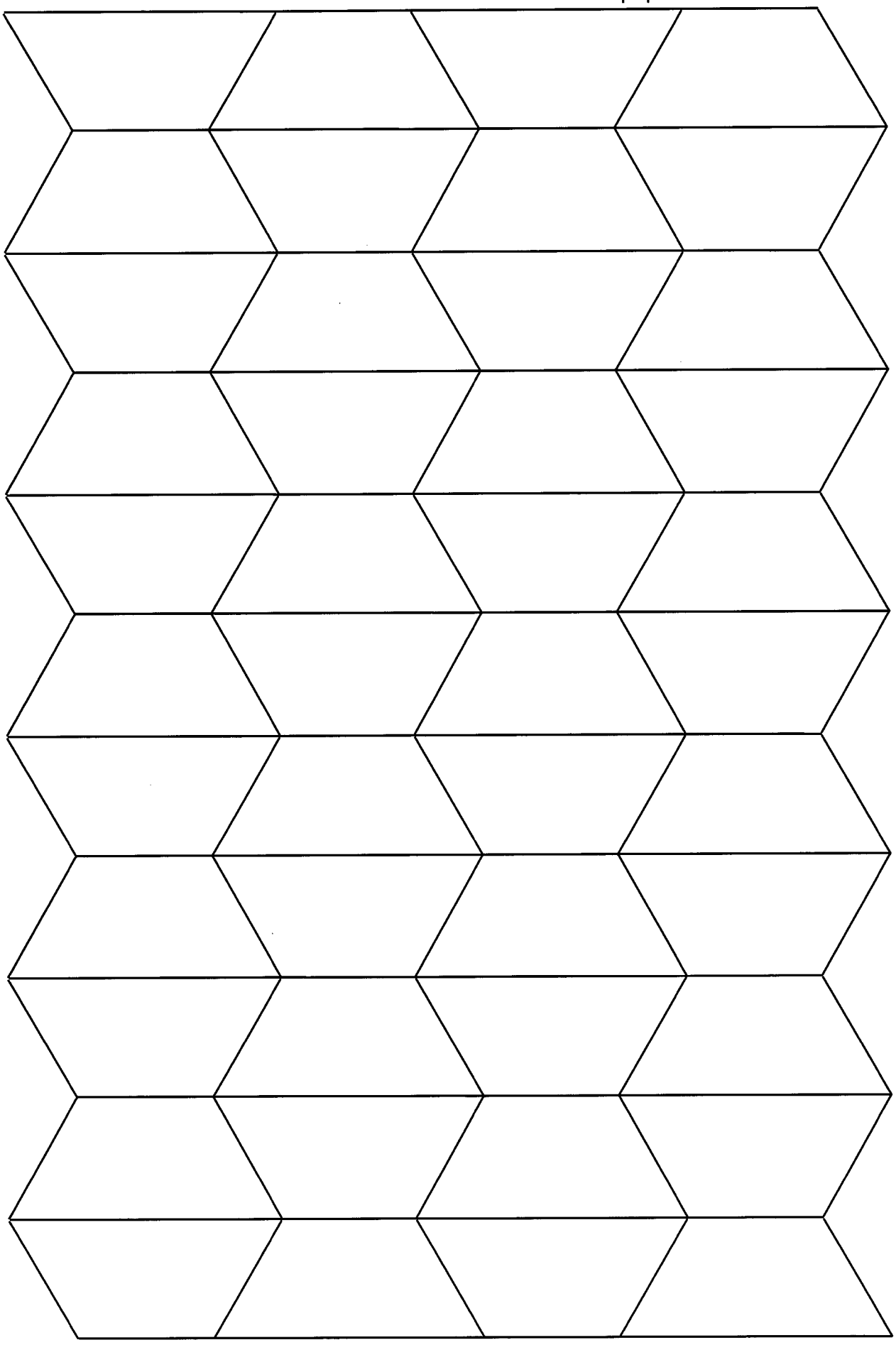


Pattern Block Shapes
Run on red construction paper



Pattern Block Shapes
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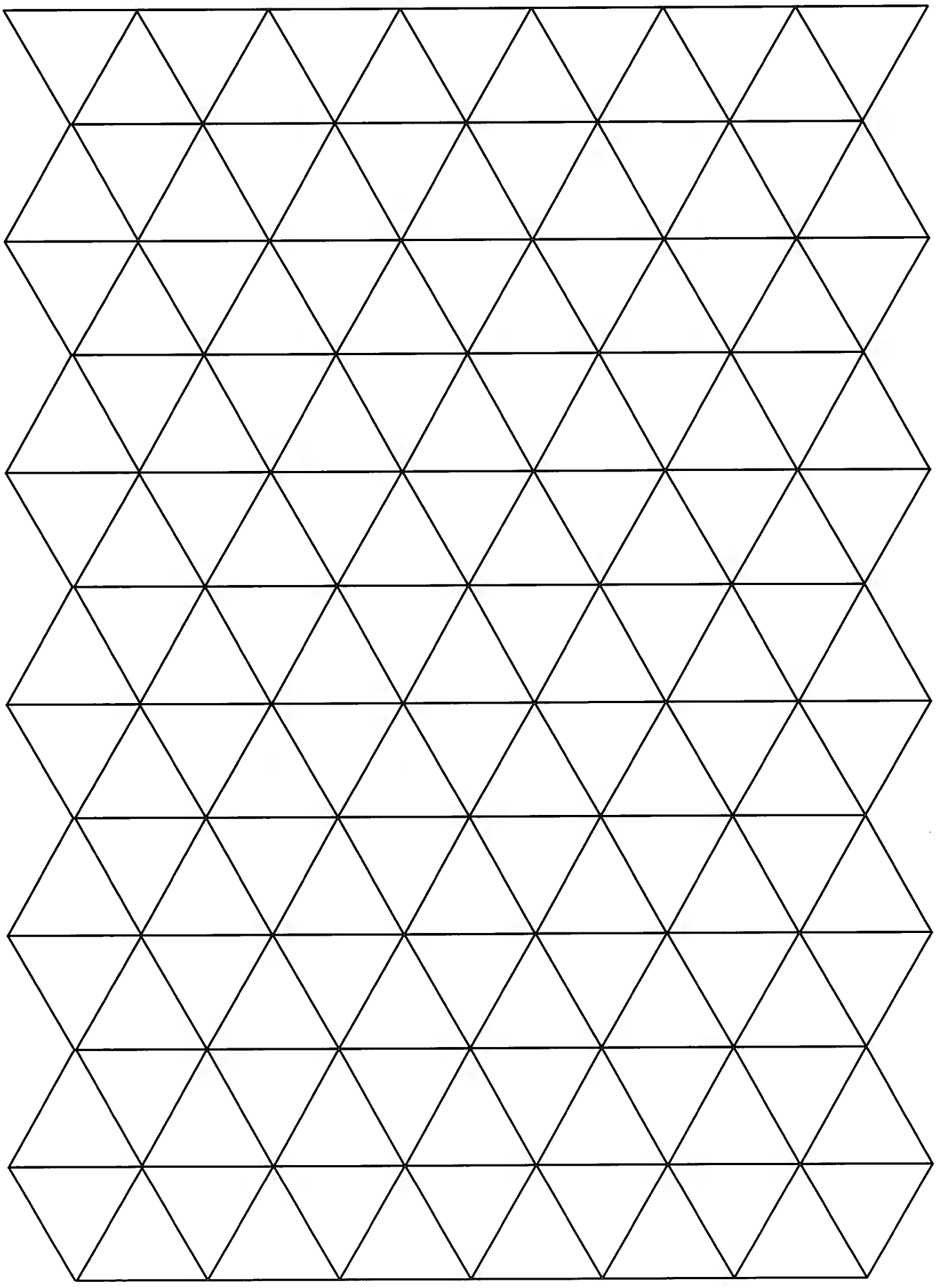

Pattern Block Shapes
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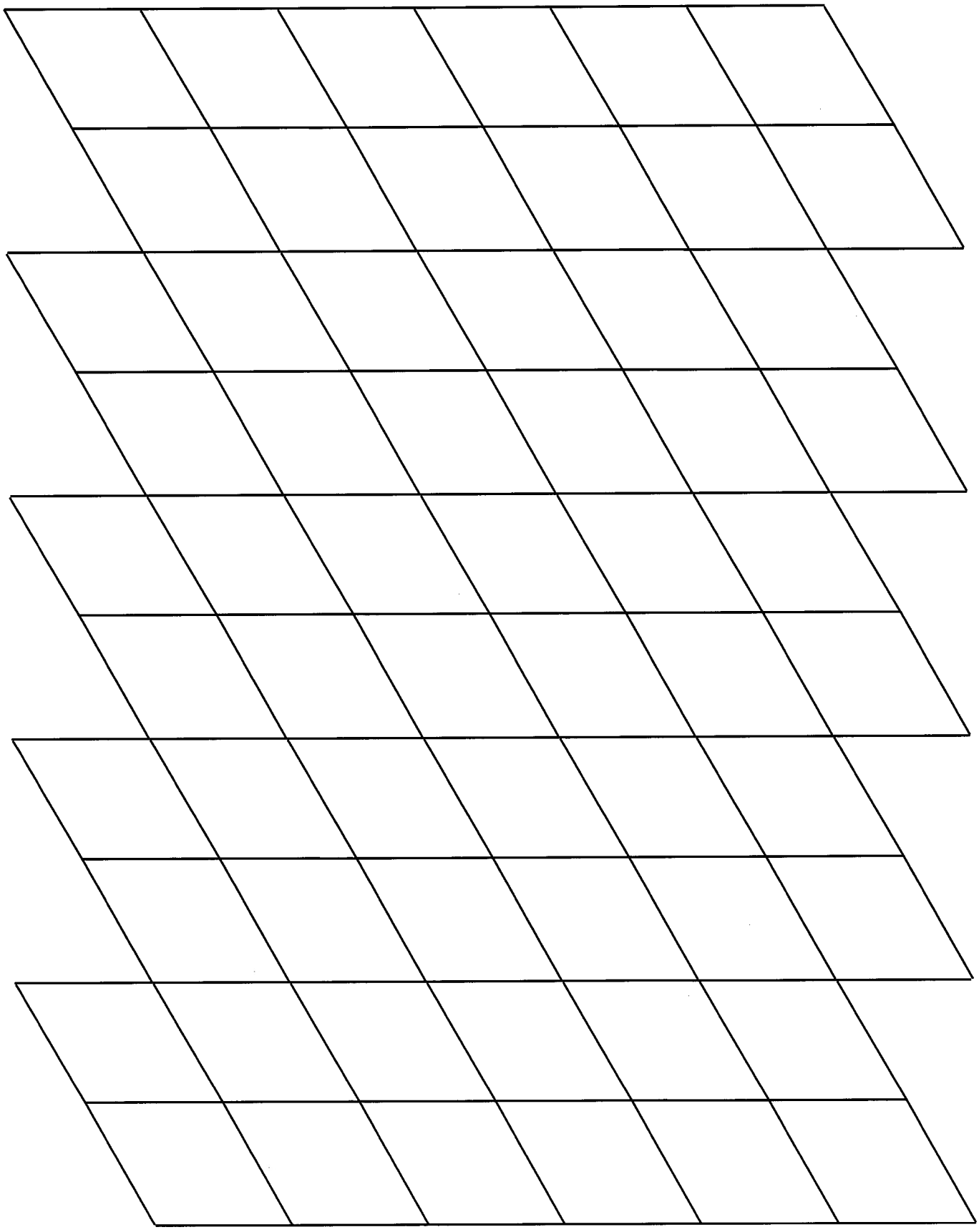

Pattern Block Shapes
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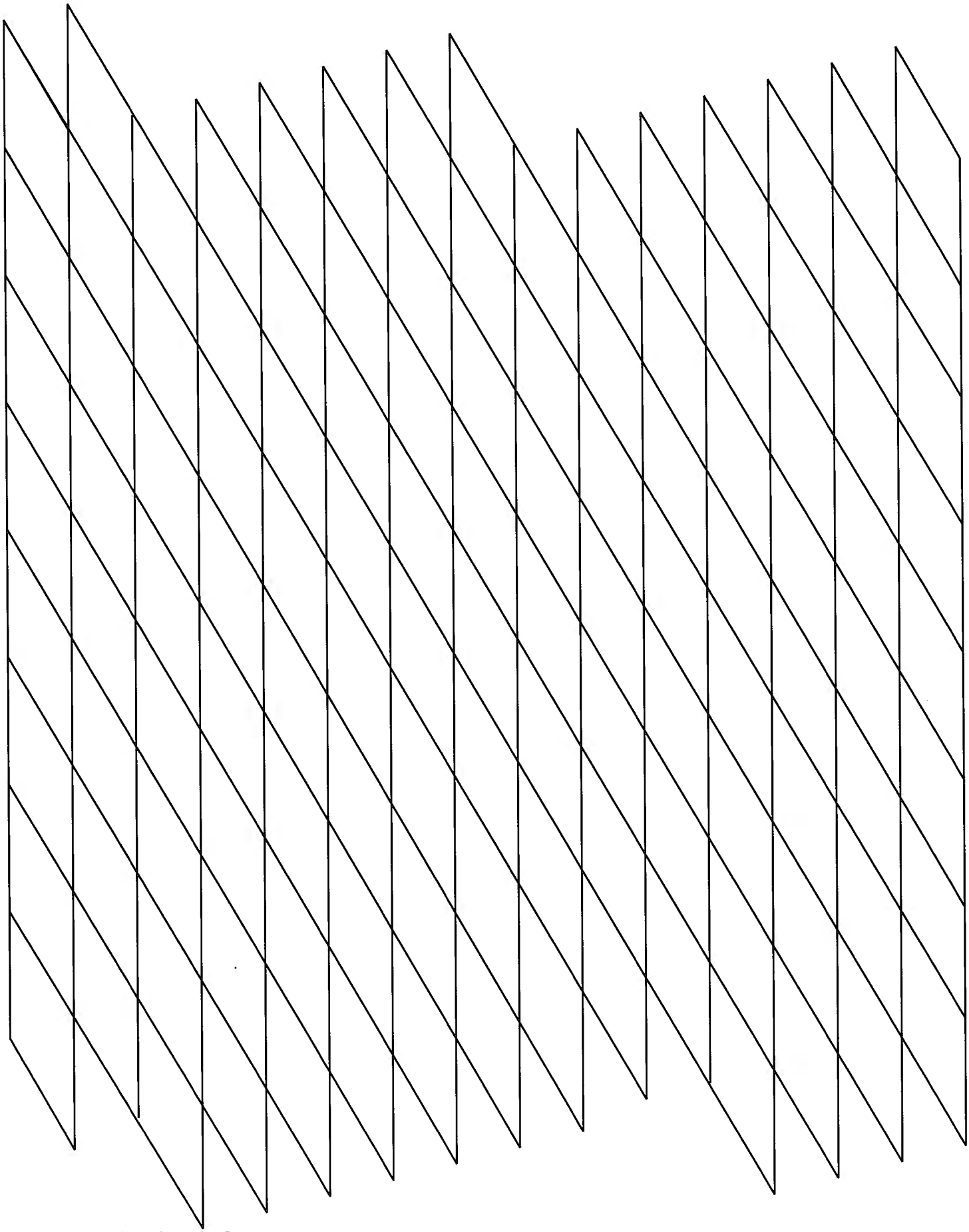

Pattern Block Shapes
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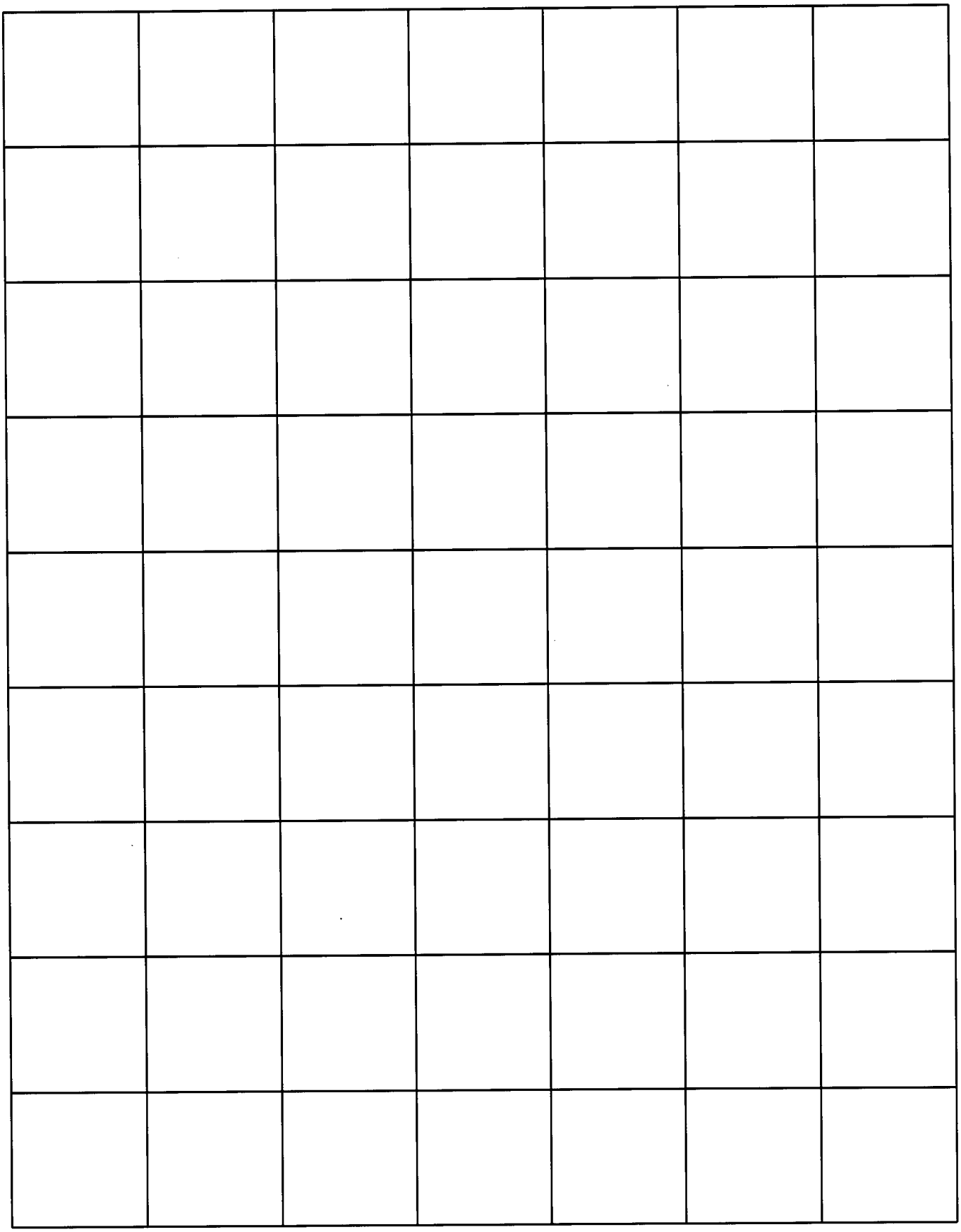
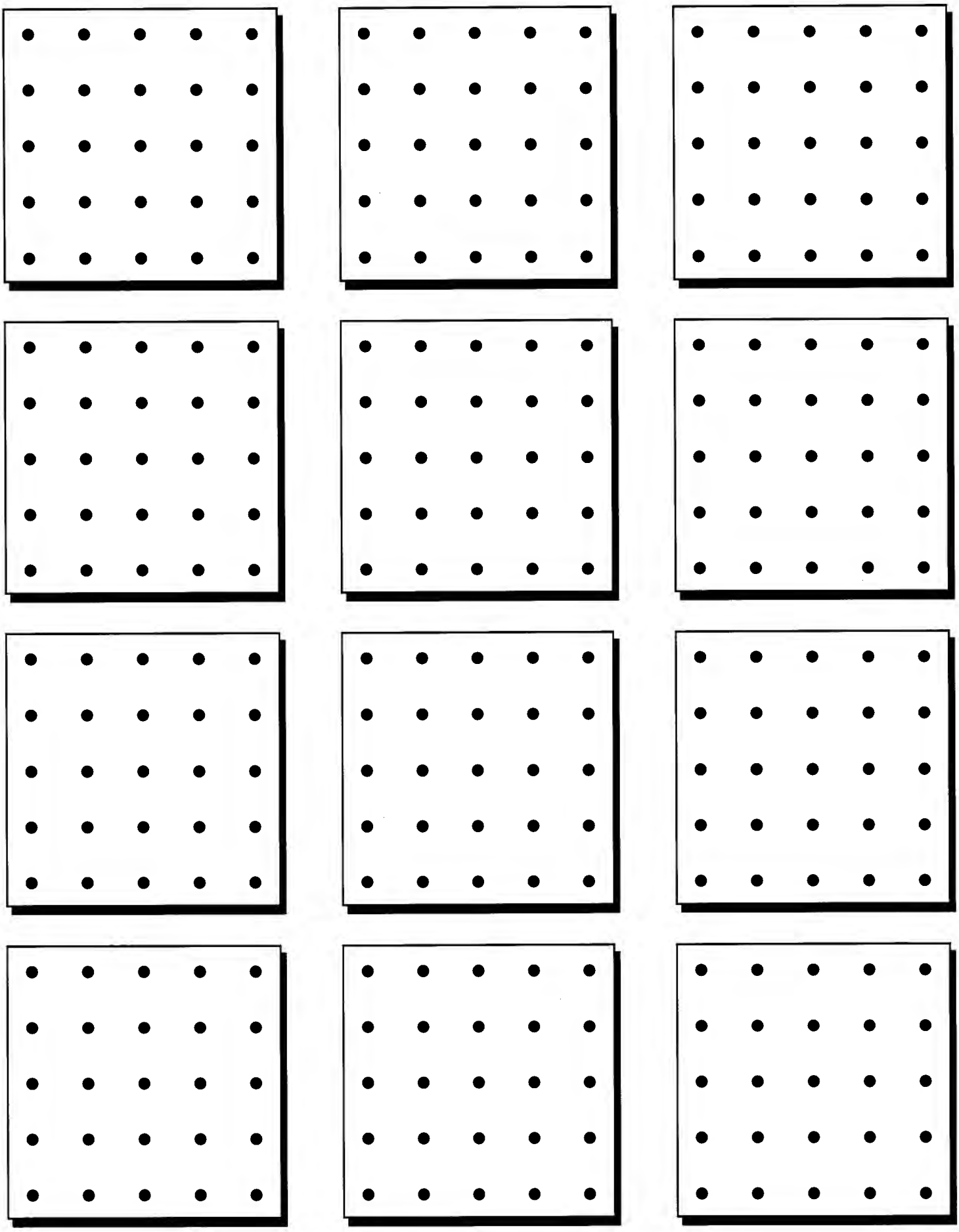
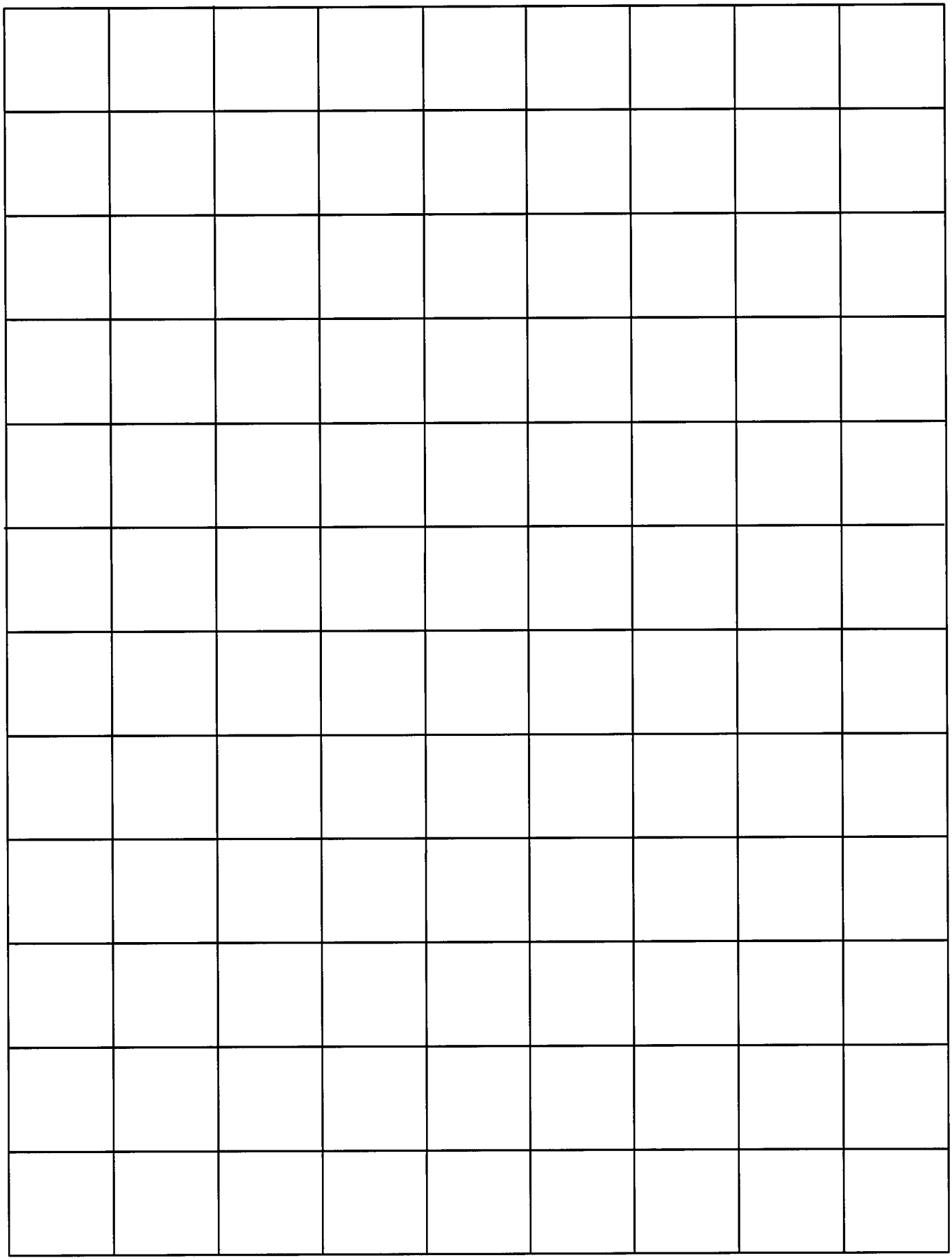


Geoboard Paper



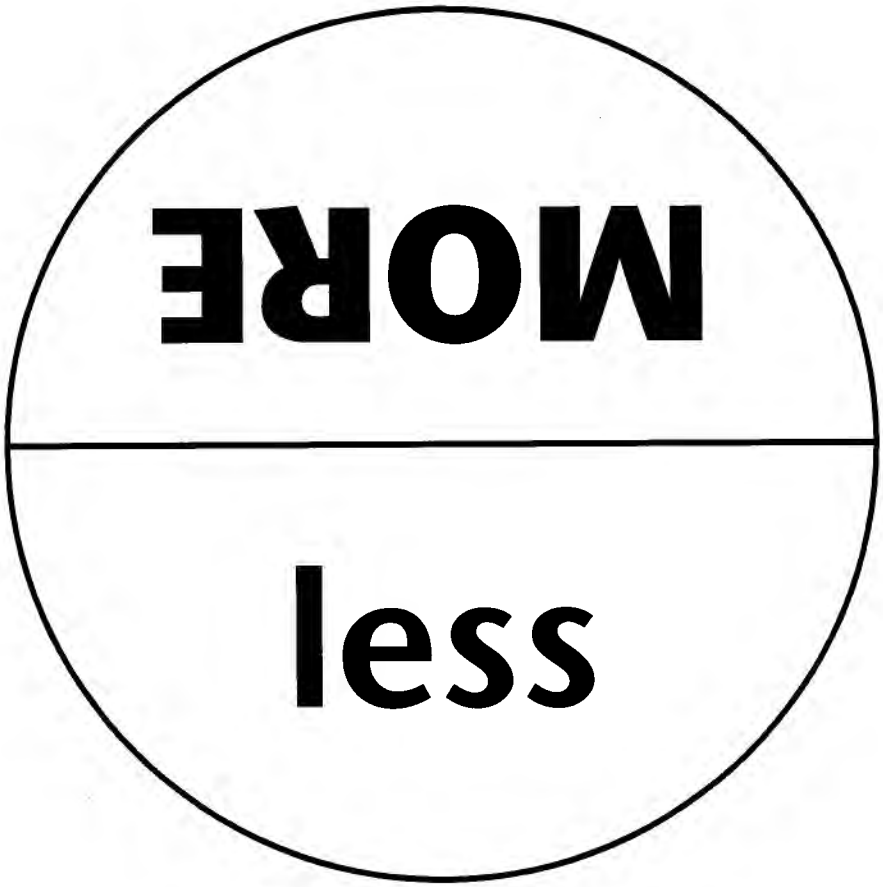


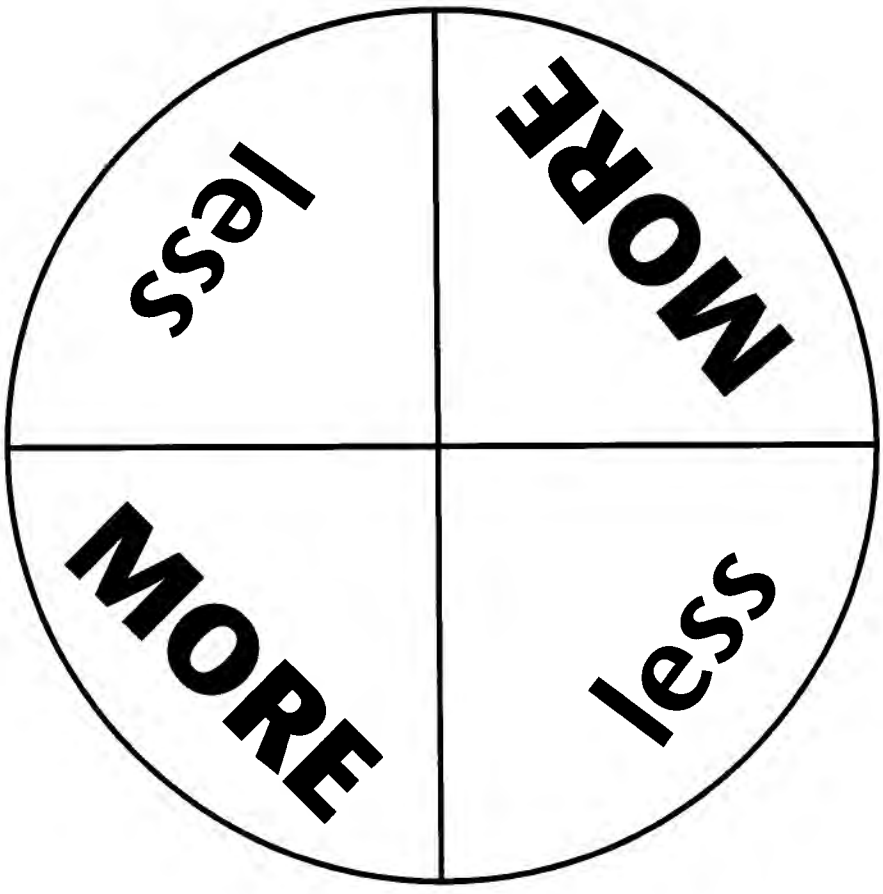
Name_____ **GUESS AND CHECK**

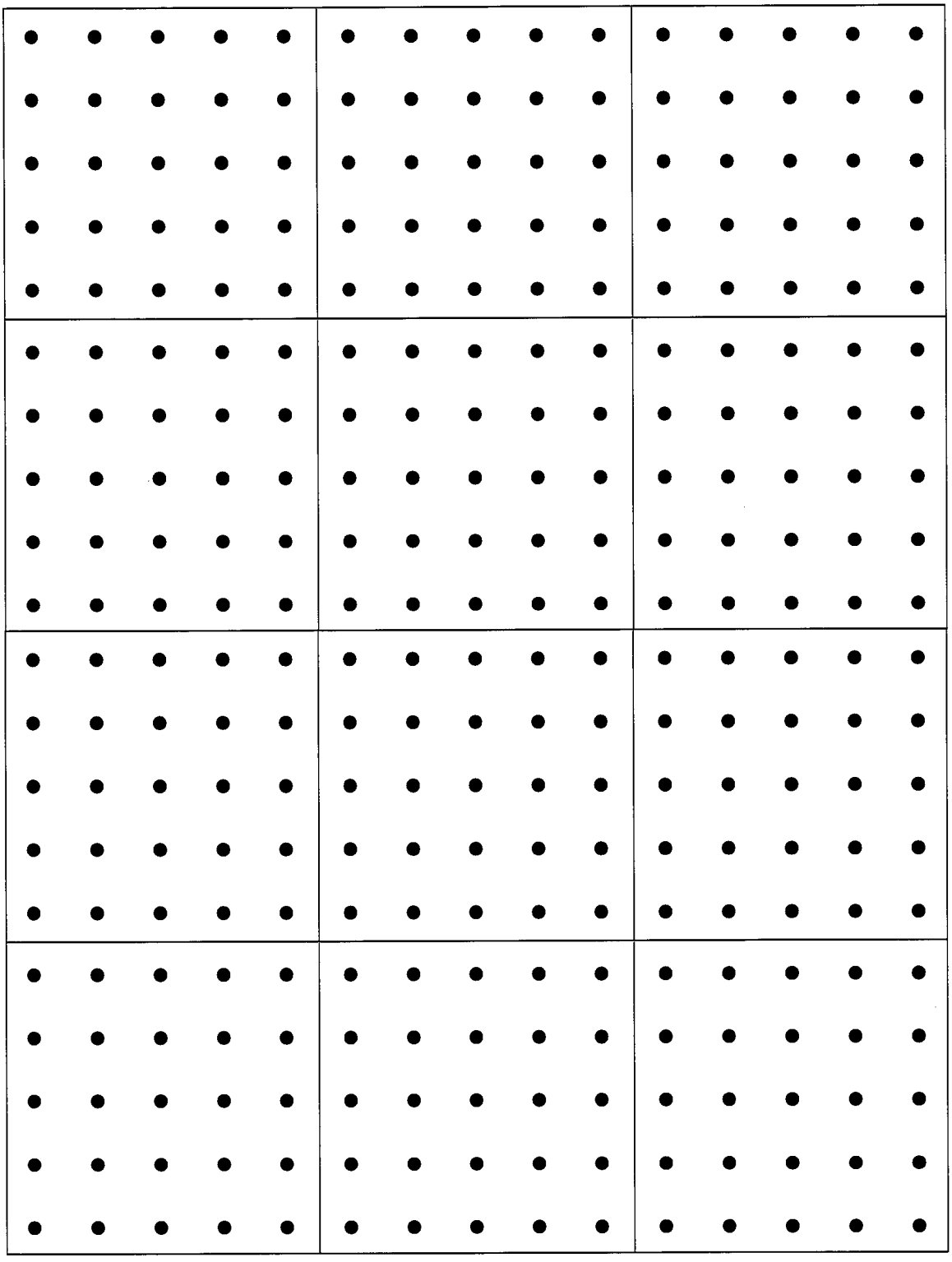
Item	Unit of Measure	Guess	Check

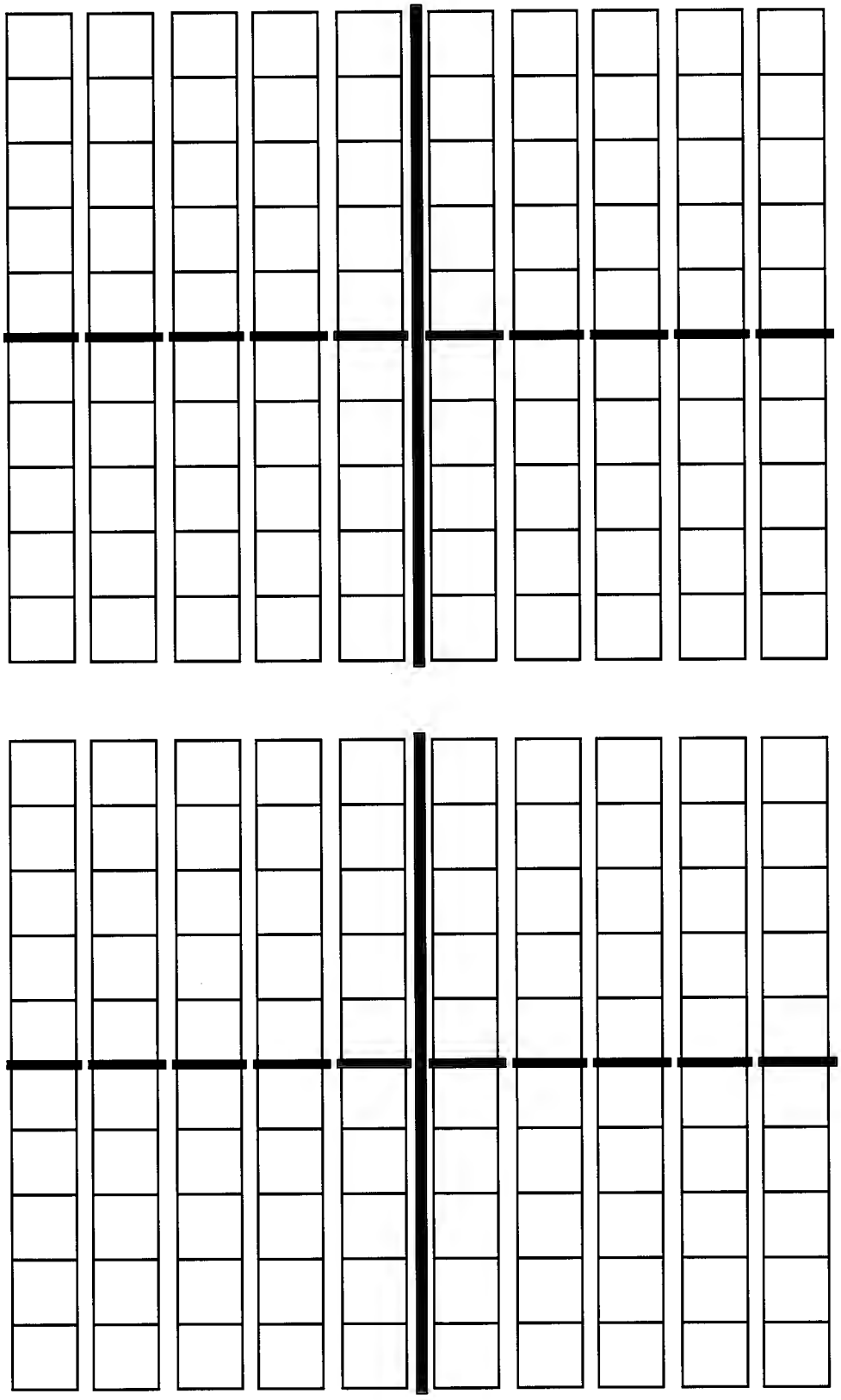
Name_____ **GUESS AND CHECK**

Item	Unit of Measure	Guess	Check









Build the following sequence of figures:

1st 2nd 3rd 4th

What might the 4th figure look like?	Justify your thinking

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1st 2nd 3rd 4th

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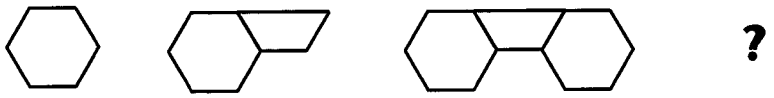
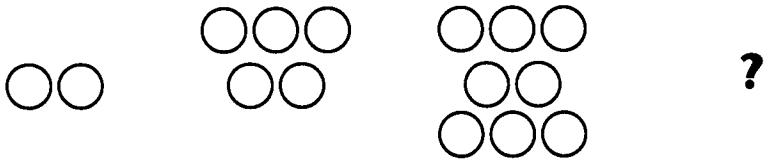


1st 2nd 3rd 4th

What might the 4th figure look like?	Justify your thinking

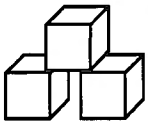
Build the following sequence of figures:



1st 2nd 3rd 4th

What might the 4th figure look like?	Justify your thinking

Build the following sequence of figures:

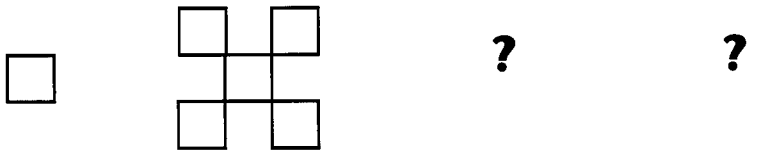



1st 2nd 3rd 4th

What might the 3rd and 4th figures look like?

Justify your thinking

Build the following sequence of figures:



What might the 3rd and 4th figures look like?	Justify your thinking

Build the following sequence of figures:

1st 2nd 3rd 4th

What might the 3rd and 4th figures look like?	Justify your thinking

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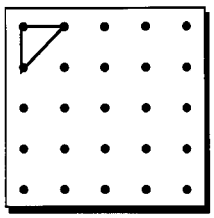
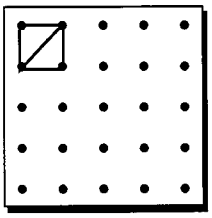

1st


2nd

?
3rd

?
4th

What might the 3rd and 4th figures look like?

Justify your thinking

Draw the following sequence of figures:

1st 2nd 3rd 4th

What might the 3rd and 4th figures look like?

Justify your thinking

Part 1

If all our names are placed in a jar and randomly drawn out one at a time, how many names must be drawn to guarantee that 2 names will be of people with the same birthmonth?

Part 2

1. If all our names are placed in a jar and randomly drawn out one at a time, how many names must be drawn to guarantee (3, 4, 5, etc.) people will have the same birthmonth?

2. How many children would have to be in a class to guarantee that 2 children will have the same birthweek?

3. Jim has socks of 5 different colors mixed up in his drawer. If he starts randomly pulling socks from the drawer, one at a time, how many draws must he make in order to guarantee getting a color match?

Amy's birthday is March 15, and Aunt Betsy offered her a choice of presents. Amy could receive $10.00 on her birthday or get a quarter a day every day, starting on her birthday and continuing through July 4. Which choice should Amy make and why?

Amy's birthday is March 15, and Aunt Betsy offered her a choice of presents. Amy could receive $10.00 on her birthday or get a quarter a day, starting on her birthday and continuing through July 4. Which choice should Amy make and why?

Can you support your answer with a model or picture? Also, write a few sentence to Amy that justifies your advice.

Describe your collection
... to the closest mat.

... to the closest strip.

... to the closest strip-mat.

What is the total area in your collection?

Describe the total area in different ways.

Set out a collection for
2 mats, 3 strips and 1 unit
with base four area pieces.

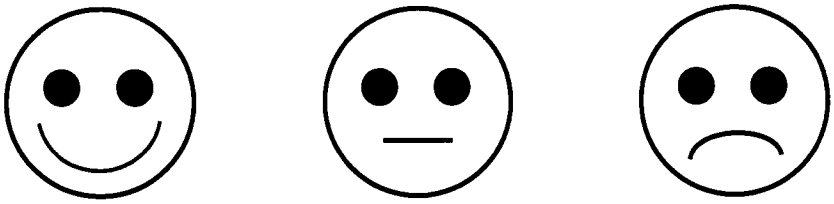
The area of your original collection has been cut in half. Sketch your new collection below.

Your collection has now tripled in area. Sketch the minimal collection for your new total.

Using your base four area pieces, build a collection of your choice. Sketch a picture of it below.

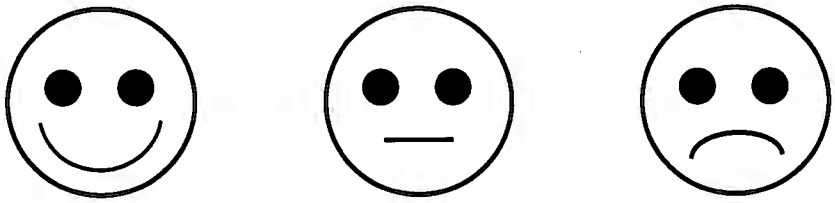
SELF ASSESSMENT

1. How do you feel about your product?



Explain your feeling.

2. How do you feel about yourself as a learner in this activity?



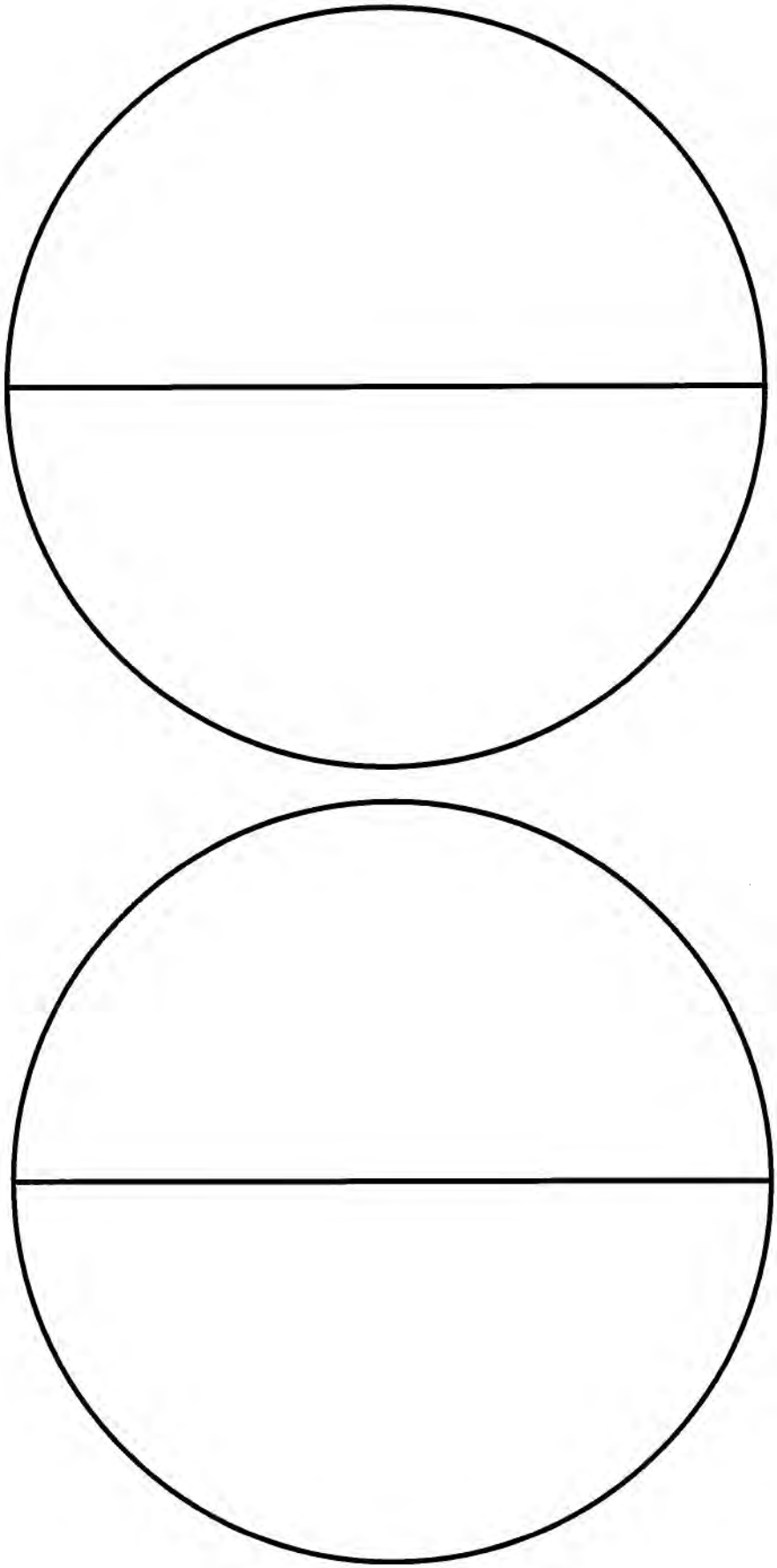
Explain your feeling.

I AM PROUD OF;

I WISH

WHEN I REVISIT THIS DRAFT, I PLAN TO:

Run copies on green paper



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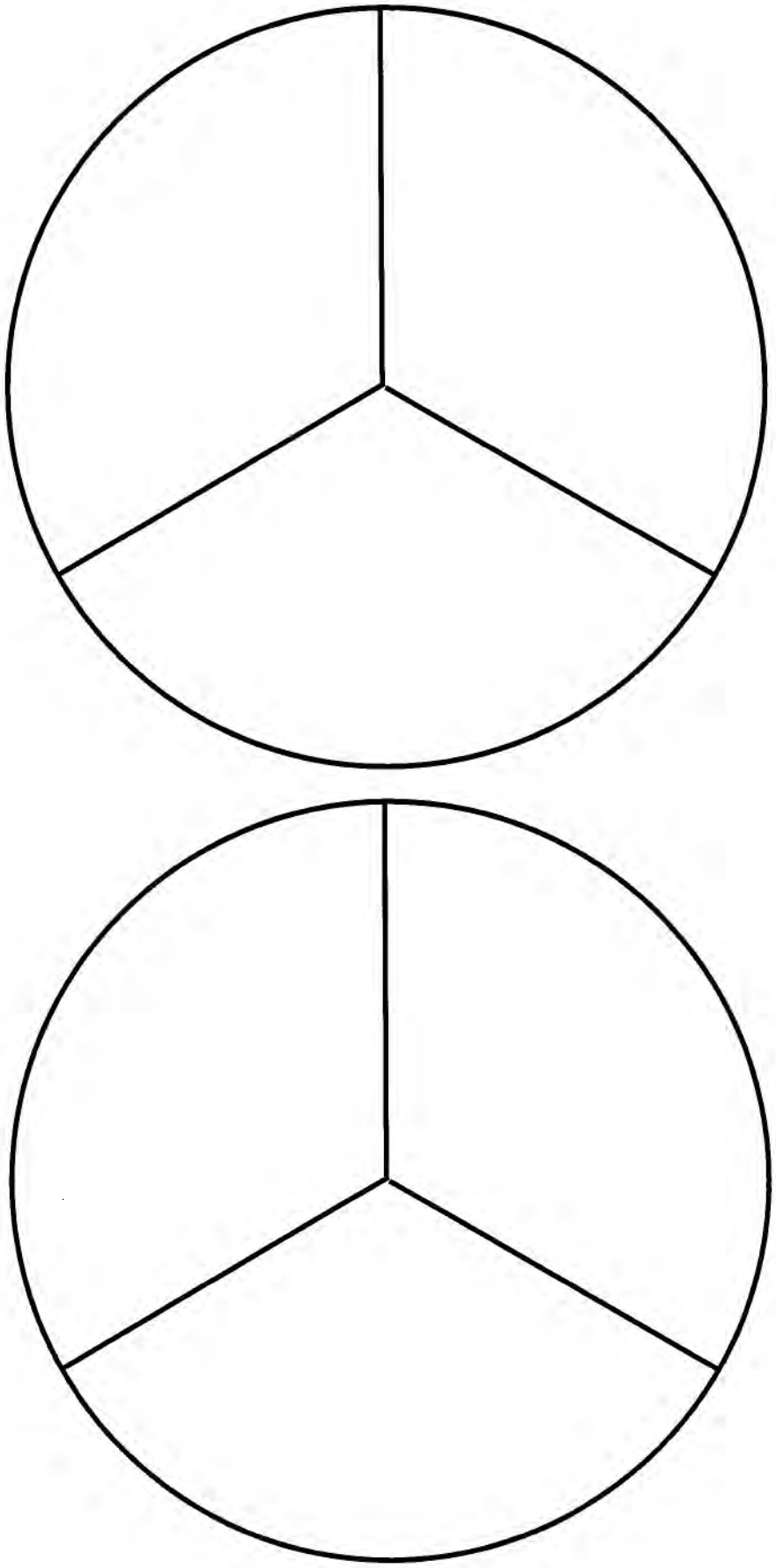

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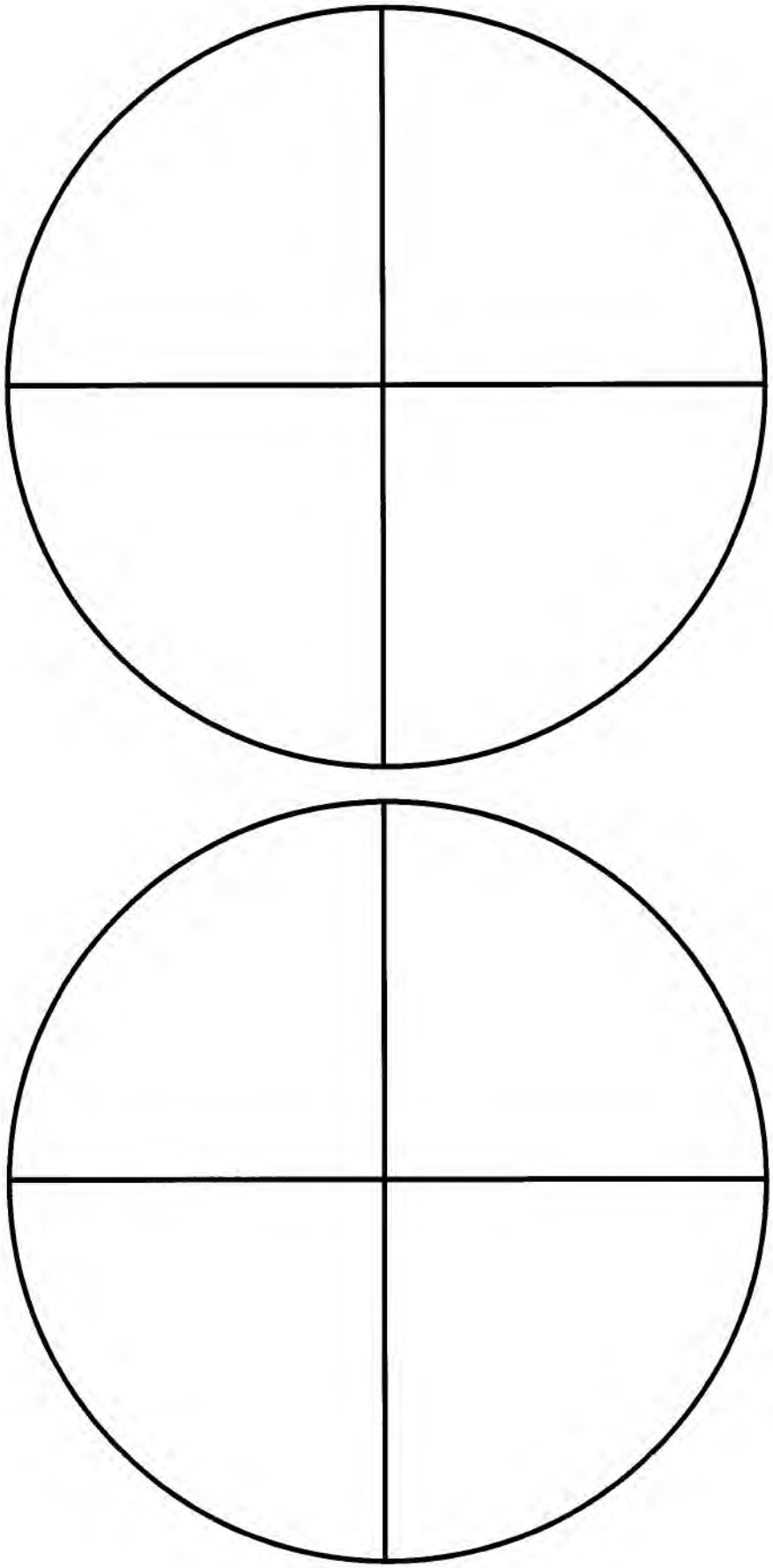

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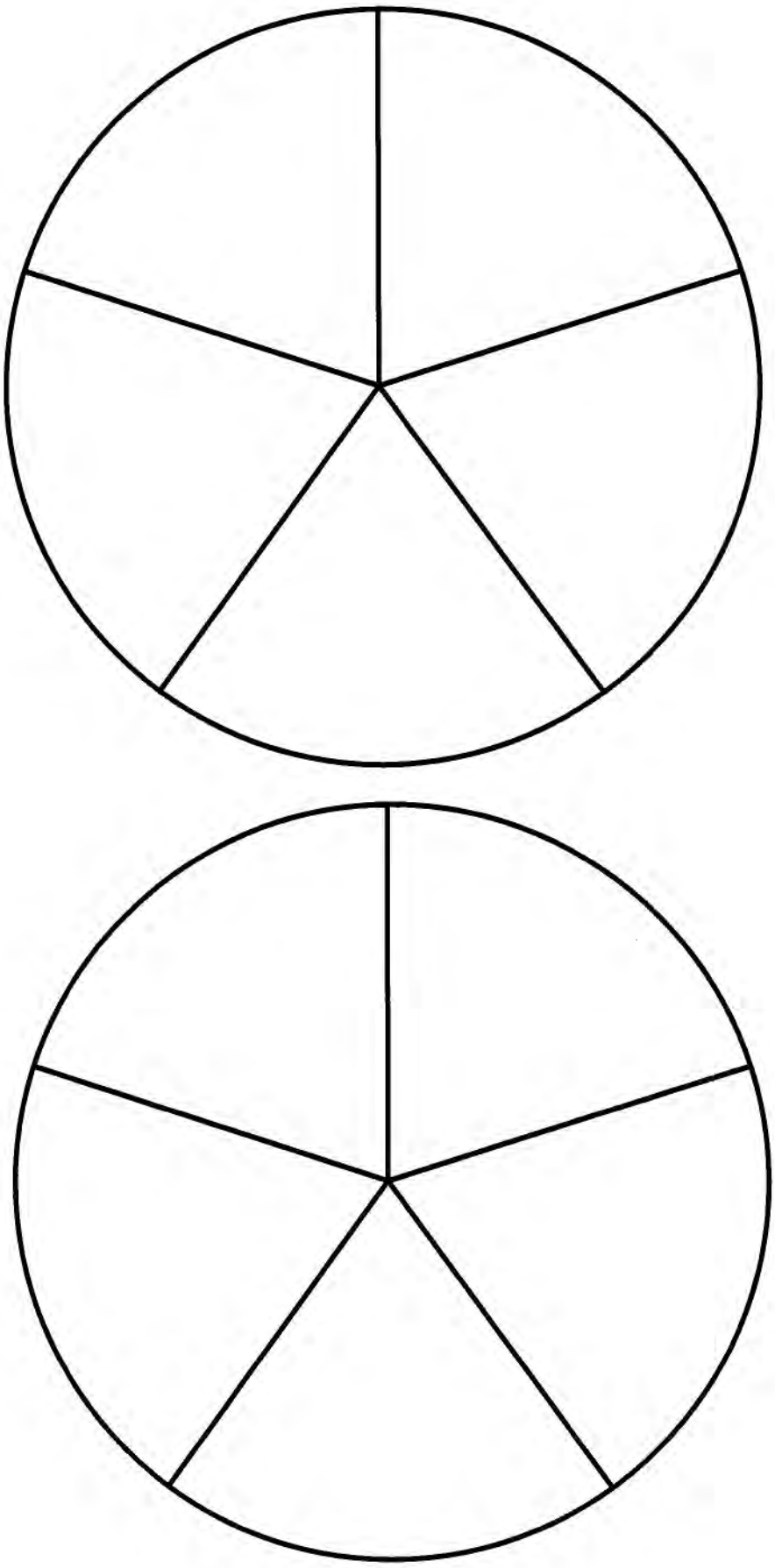

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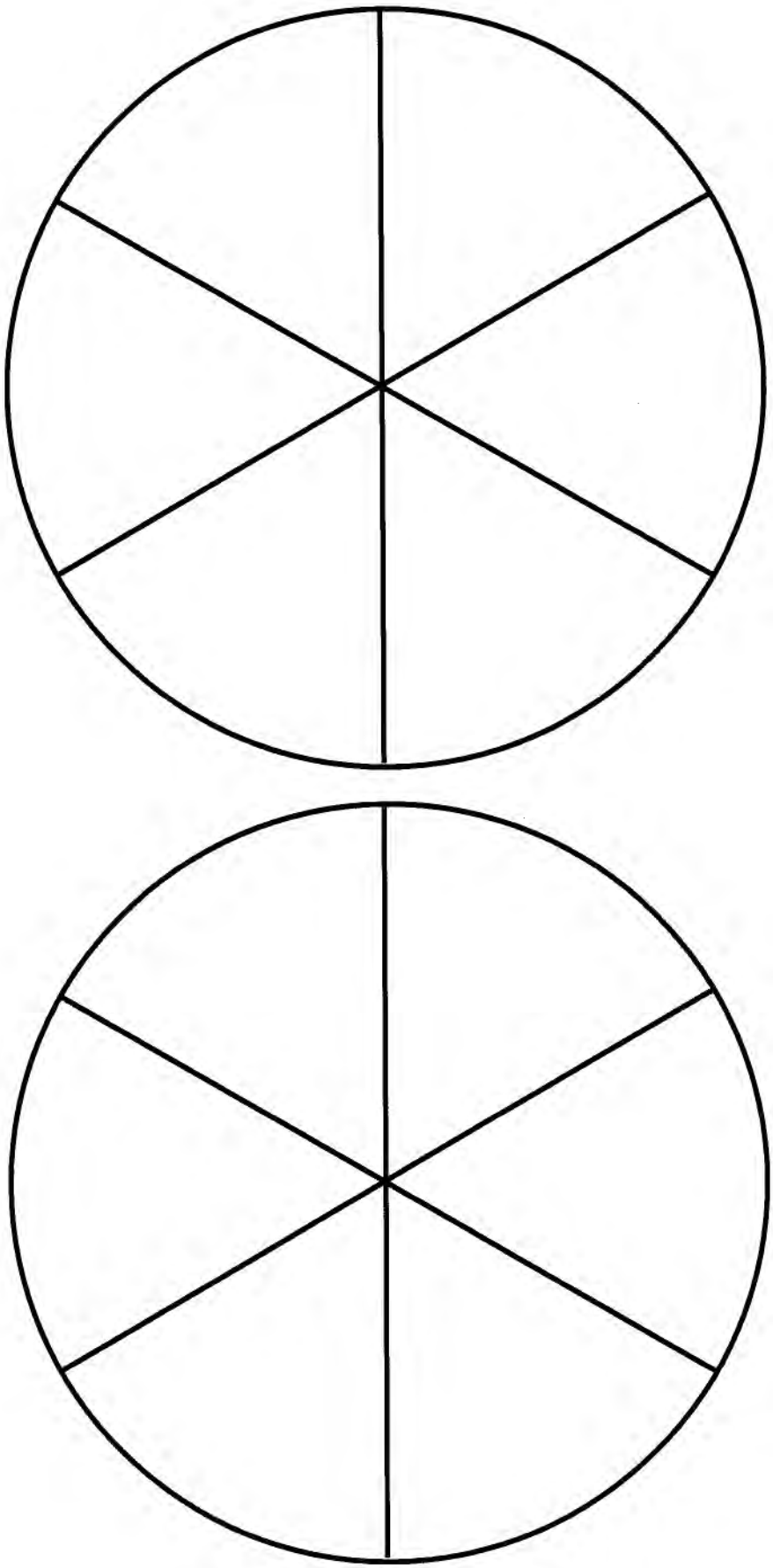

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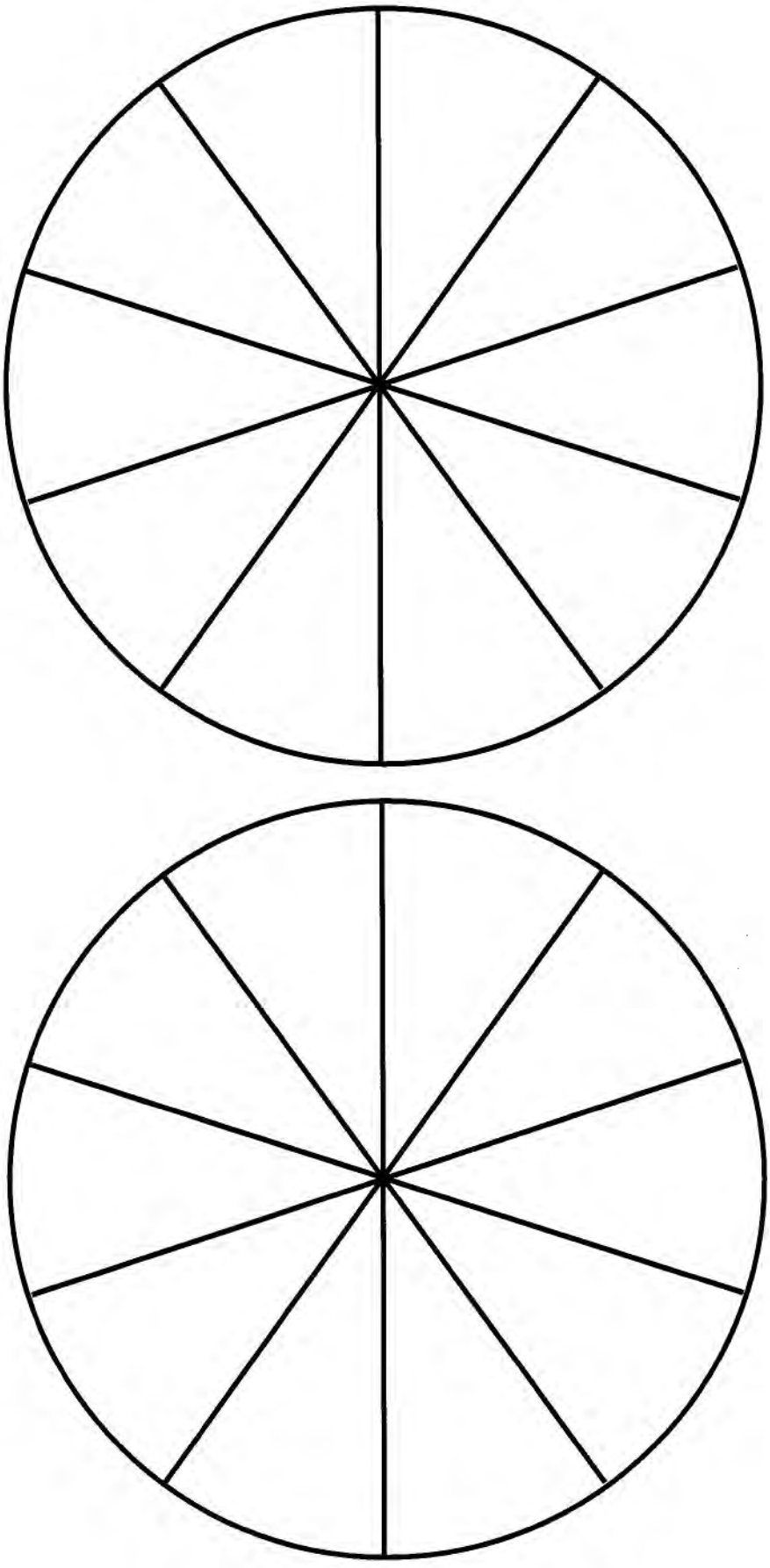

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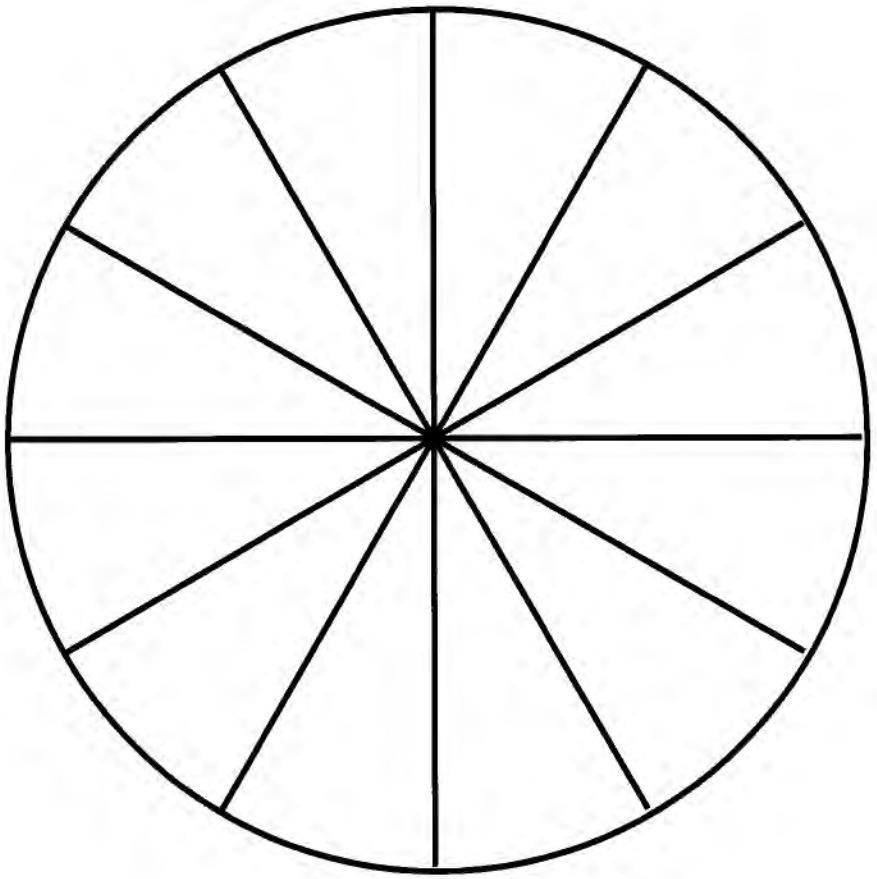
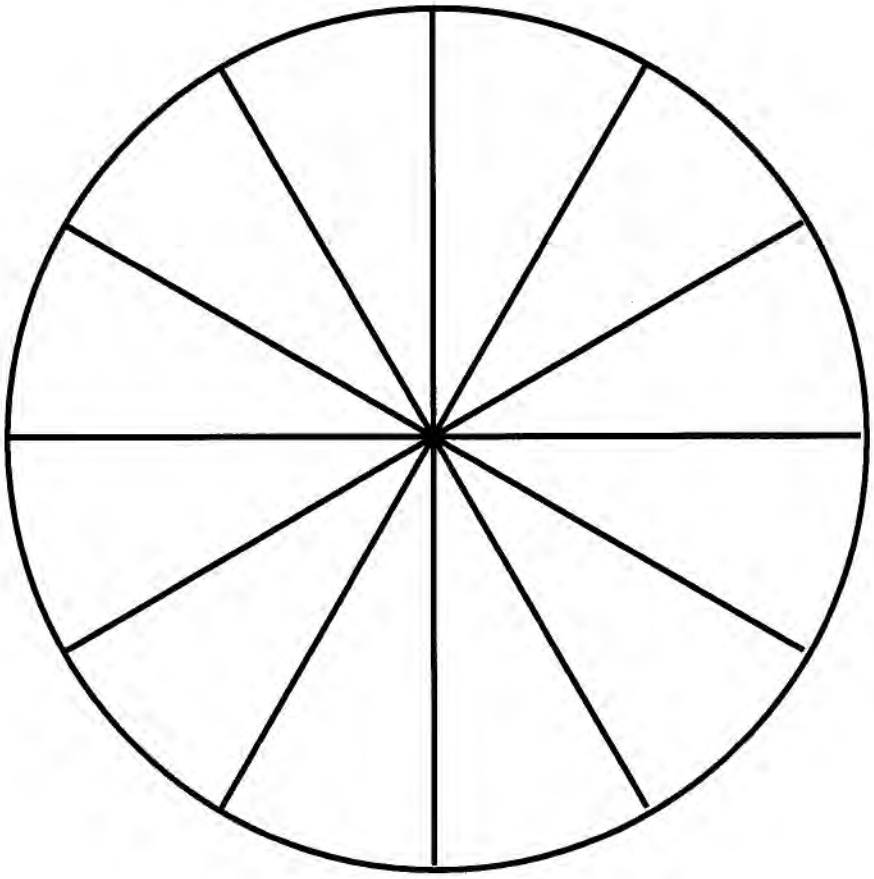
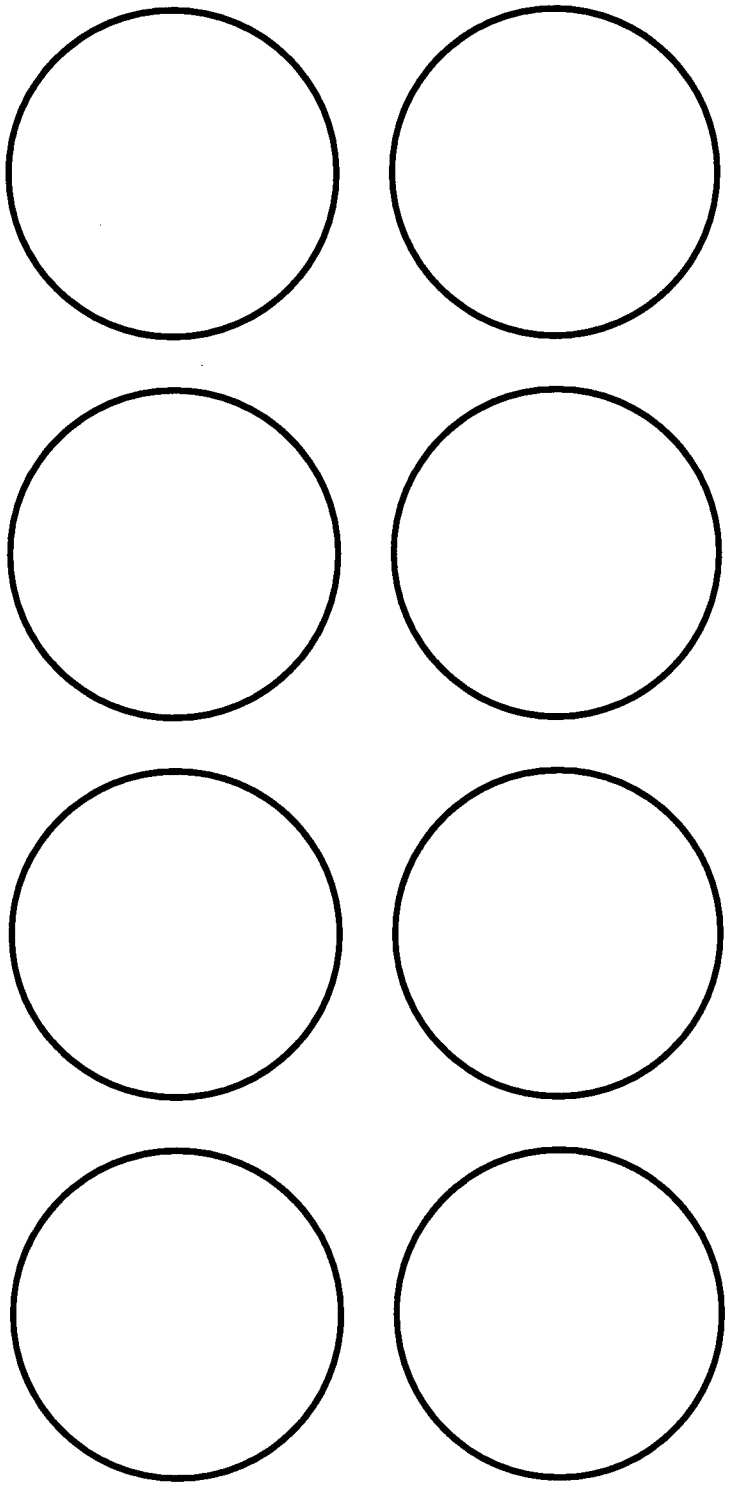






My Observations:

Hypotheses or Conjectures:

1. Karen had a dollar. She spent one-fourth of it on candy. She spent half of her dollar on pencils. How much money does she have yet to spend? What fraction of her dollar remains? Sketch a picture of your work and write some equations to match your picture.

2. One-half of the children in Mr. Thomas' class had only a brother. Four children had only sisters. One-sixth of his class of 24 pupils had no brothers or sisters at all. How many people had both brothers and sisters? brothers only? were an only child? Sketch a picture and write some related equations to match.

3. It's the end of the school year and few crayons survived. Ray and Henry decided to combine their remaining crayons and share them. Ray had one-half of his original box of 16. Henry had one-third of his original box of 24. How many crayons did they have in their combined collection? Which boy contributed more crayons? Sketch a picture. Write some related equations to match your picture.

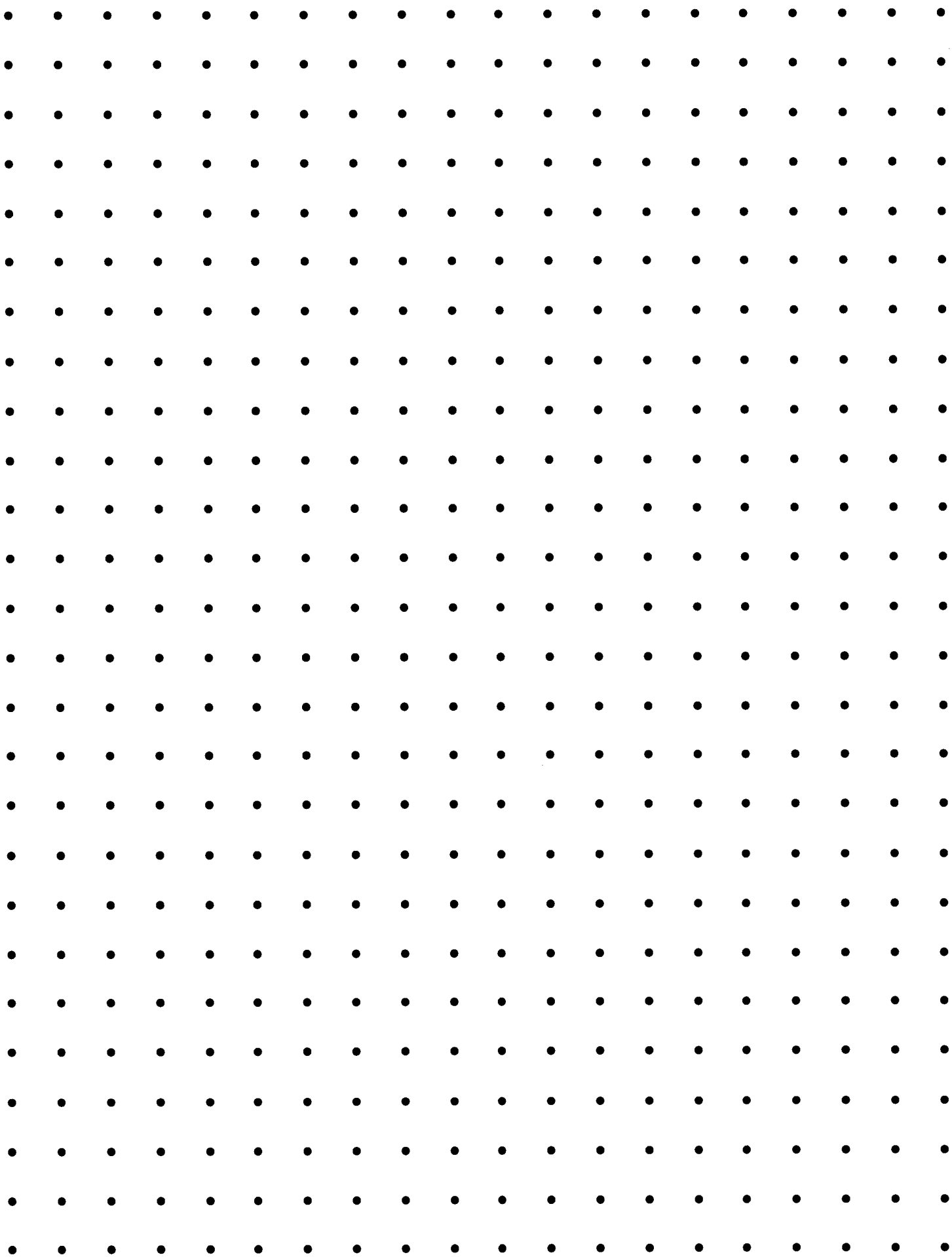
4. The mail carrier delivered mail to the Head's home. Randy got 8 letters. He was thrilled because half of the delivery was addressed to him! Amy and Debby each got 2 letters. Curtis got the remainder of the mail. What fraction of the day's mail was addressed to Curtis? How many letters did he get that day? Sketch a picture of your work. Write some related equations to match your picture.

1. Describe this activity.

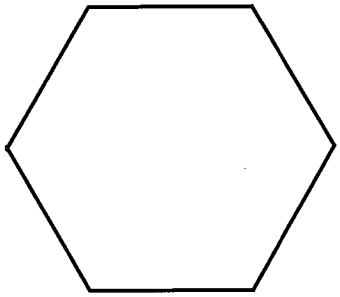
2. Before beginning, if the game is played over and over, which player, A or B, do you think is likely to score more points? Why?

3. Test your prediction by playing the game. Your partnership can decide how many times you wish to play. Prepare a graph of the data you collect.

4. Now form a group with another partnership and add your results to theirs. Prepare a graph of the combined results. Glue this graph and the one you made in Problem 3 to a piece of chart paper.



Suppose you are arranging tables for a banquet or birthday party. There are five hexagonal-shaped tables to be arranged. Each table looks like this:



1. If the tables must join along at least one full side, what different table arrangements are possible?

2. If only one person sits along a side, what is the fewest number of people who could be seated? The largest number of people? Explain your thinking.

3. Is it possible to arrange the tables so there is one person seated along each side and the total number of people is odd? Explain.

1. You are building a rabbit cage and have enough money to buy 24 feet of fencing. What size options do you have for the rabbit cage? Which cage would you build? Why? Explain your thinking with the help of diagrams or sketches.

2. King Arthur had 32 knights. He ordered his servants to slide small square tables together to make one big long table for the banquet. If only one person can sit along a side, what is the fewest number of tables that could be used to seat everyone? Explain your thinking.

student		teacher
	Did the student—	
❒	Retell the problem in their own words?	❒
❒	Include a clear diagram of their solution?	❒
❒	Label diagrams correctly?	❒
❒	Use clear, elegant mathematical language?	❒
❒	Create correct solutions?	❒
❒	Do more than the problem asked?	❒
❒	Work neatly?	❒
❒	Include a variety of solutions?	❒
❒	Communicate their thinking clearly?	❒
❒	List tools used?	❒

To the student:
Did you enjoy this problem? Why or why not?

How do you feel about yourself as a mathematician?

Suppose a school is chartering buses for a special year-end trip to Chicago. These people plan to make the trip: 142 children, 5 teachers, 18 parents and 1 principal. The law allows a maximum of 2 people per seat. How many buses should be reserved for the trip?

Draw a model or picture to explain your thinking. Describe your pictures with sentences and equations.

Bonus: How can the principal assign people so each bus carries the same number of adults and the same number of children?

Mr. Harper picked up 19 boys and 13 girls on his bus last Tuesday. His bus has 30 seats. If each person sits with a partner, how many seats were filled last Tuesday?

Draw a picture to illustrate your answer. Write some sentences and equations to match your picture.

Bonus: How many more people could Mr. Harper have picked up last Tuesday without breaking the law?

Double Bonus: After Mr. Harper filled his bus last Tuesday with children, there were the same number of girls as boys. How many more boys did he pick up? How many more girls?

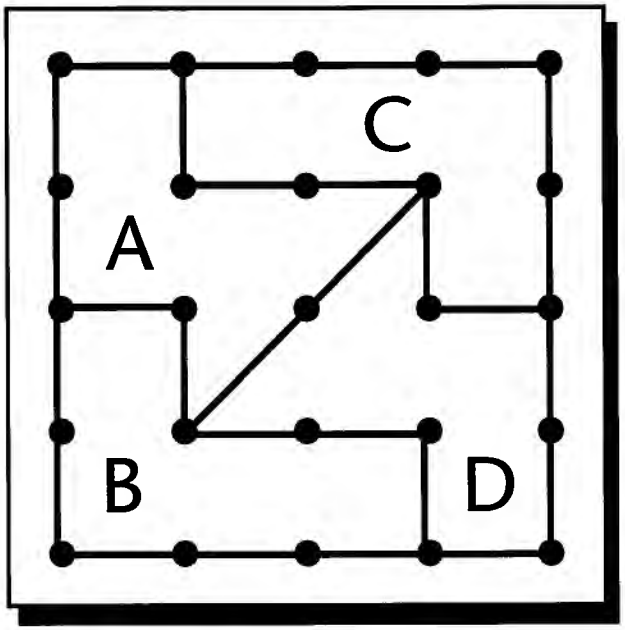
A scout troop has collected $100 to buy food for the local community shelter. How would you advise the troop to spend the money? Use grocery ads to help you plan a recommended shopping list. Use the chart below to keep a record of your purchases. Remember to provide a balanced diet.

food group **budget**

item	quantity	cost for one	total cost

TOTAL SPENT _____

1)



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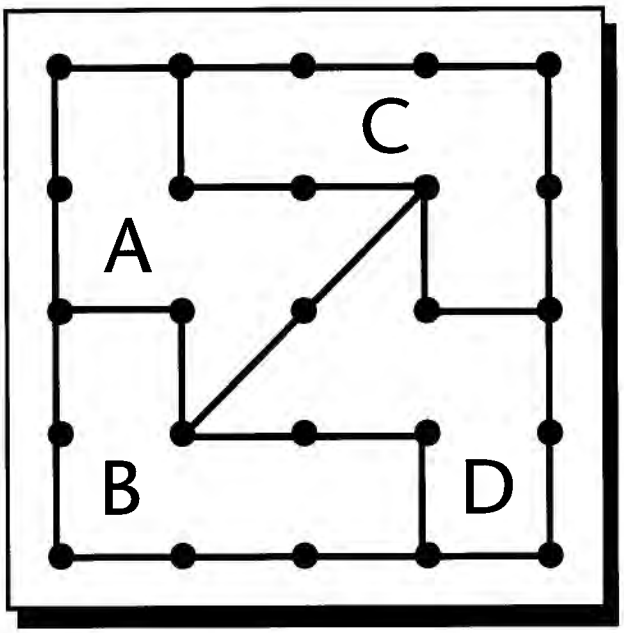

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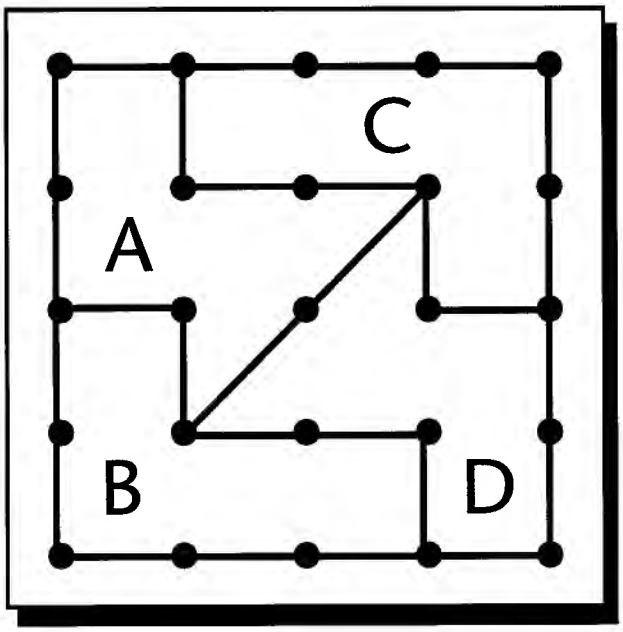
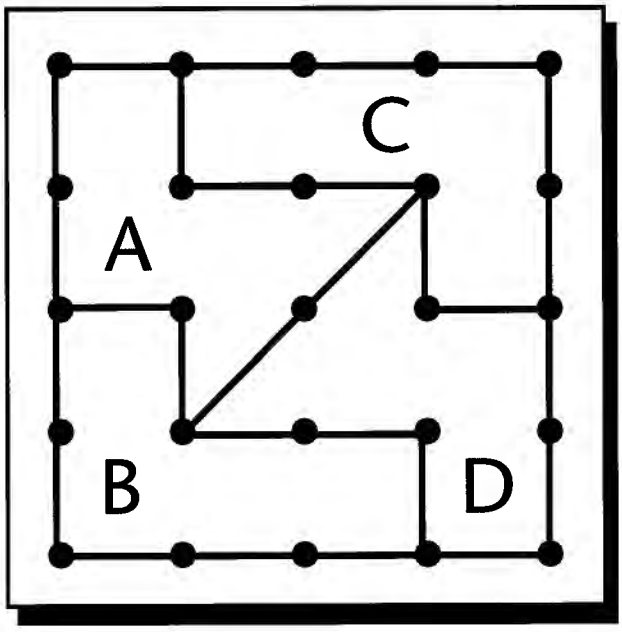
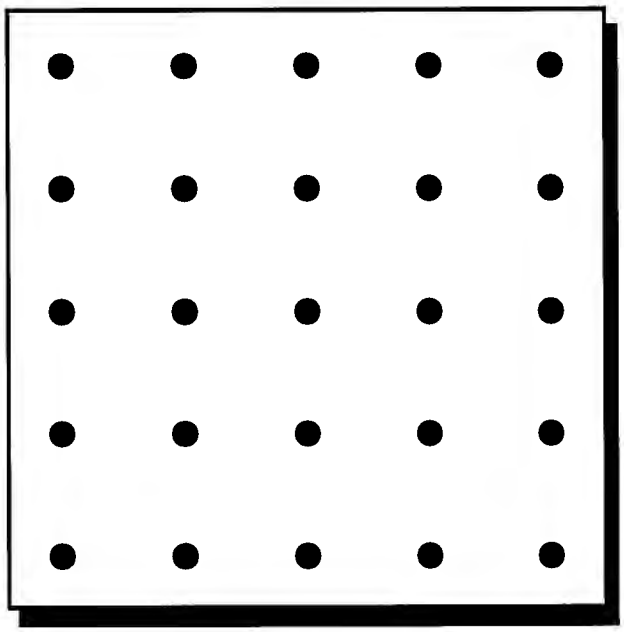


4)



1)



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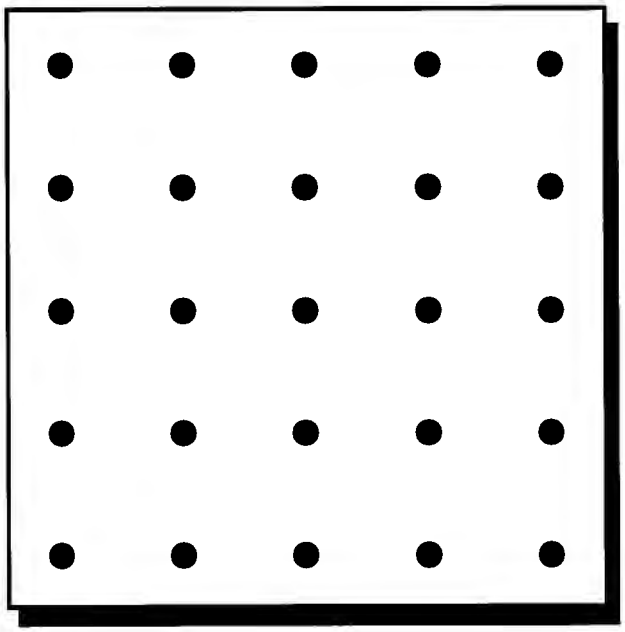

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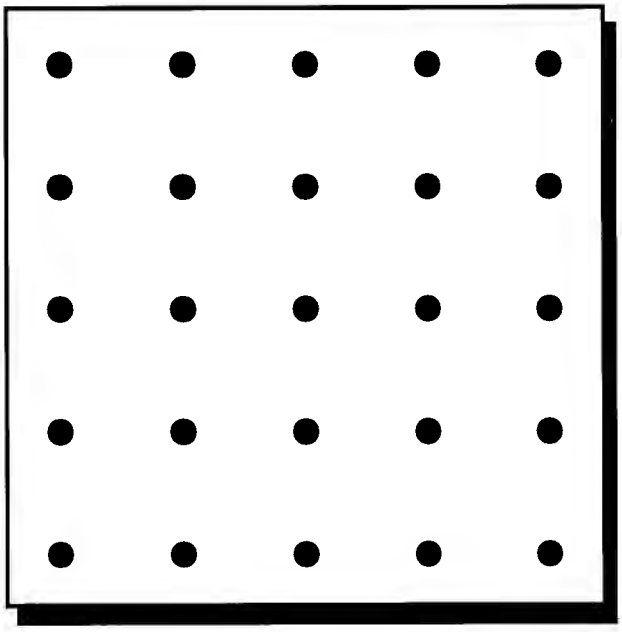

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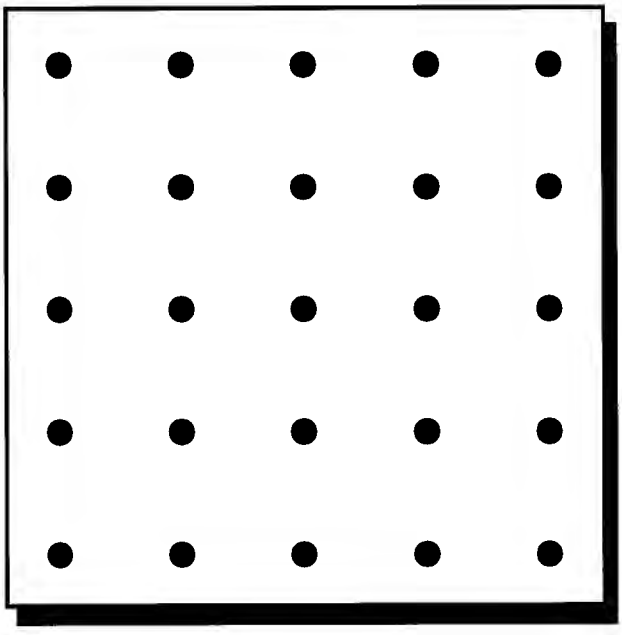


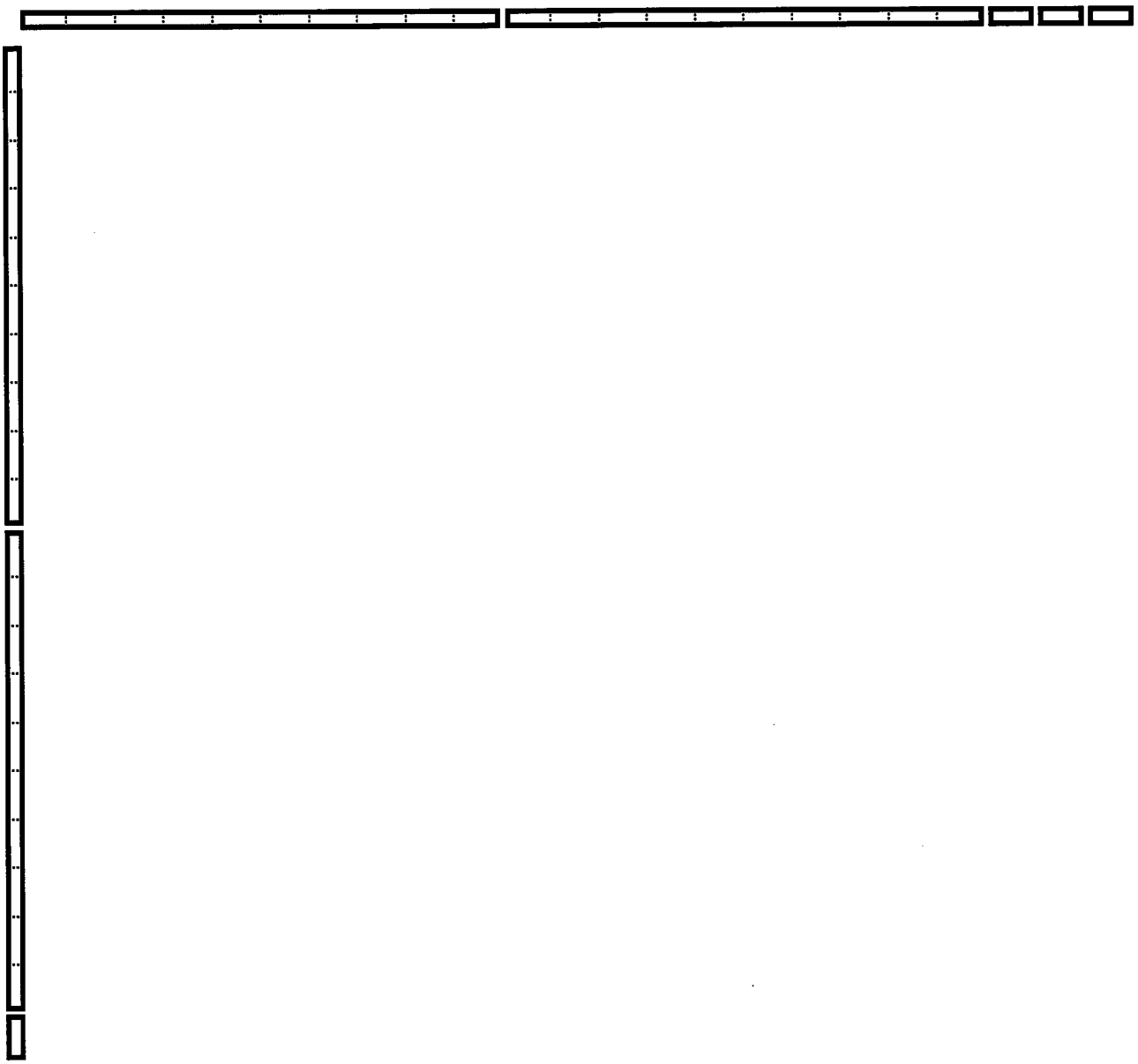
Your team is entering a box cover contest that has the following rules.

1. Each team must create a paper cover for its box.

2. Each entry must be accompanied by a persuasive letter to the box company. The letter should describe how the entry is superior to all other entries.

3. Other rules are:
a) The cover must be in one flat piece.
b) You are not limited to edge cuts.
c) You are not limited to straight cuts.
d) Your cover must fold to cover your box with no gaps and no overlaps.
e) The use of tape is permissable.
f) Color or decorative design will not be considered.
g) You must show evidence of team effort.
h) You must show evidence of mathematical understanding.

1)



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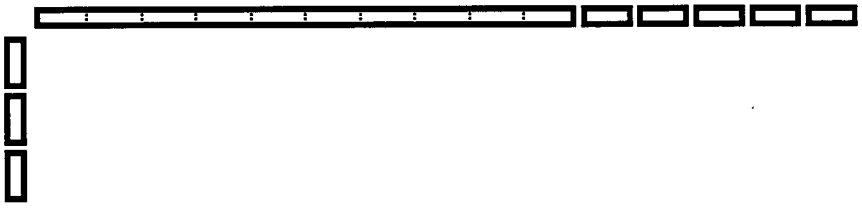


Joyce's family plans to spend about $65 a day on their vacation for food. If their vacation is going to last 12 days, how much money should be budgeted for food altogether?

Will's family's car averages about 27 miles per gallon. About how many gallons will be needed to travel 430 miles?

The fourth grade at Li's school has 198 children and wants to have enough rolls to feed everybody at the upcoming picnic. The rolls come 12 to a package. How many packages of rolls should be purchased?

This year Curtis' basketball team scored a total of 672 points in 16 games. Last year, his team scored a total of 538 points. How many more points did Curtis' team score this year than last year?

Try this mentally: About how many points did Curtis' team average per game this year?

Try these in your head:

$23 + 47 + 83$ $643 - 256$ 27×8 $6\overline{)126}$

$3 \times \frac{1}{2}$ $3 \div \frac{1}{2}$

Perform the following computations:

$\begin{array}{r} 32 \\ \times\ 28 \\ \hline \end{array}$ $8\overline{)436}$ $123 + ? = 711$ $1128 \div 24$

$.5 + .72$ $1.31 - .45$ 1320×26

Alice read that her favorite singing group was about to go on a 24-day trip, traveling about 175 miles a day. How many miles will the group travel altogether during its trip?

A contestant's score on a game show was 575 points. However, the contestant missed the next question and lost 800 points. What was the contestant's new score?

The contestant then lost another 83 points. Now what was the score?

Bill has collected 376 baseball cards. His friend, Jeff, has a collection of 530 cards. How many more cards does Bill need to collect to have as many cards as Jeff?

Three boys played a video game and got these point totals:

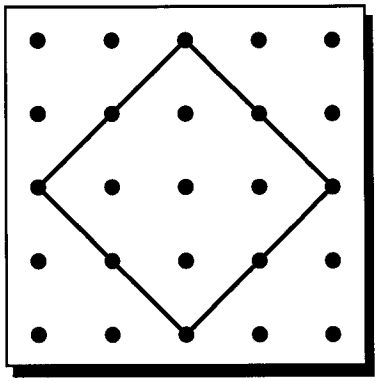
Jeff: 233 points
Allen: 428 points
Scott: 342 points.

How many points did the boys get altogether?
How many more points does Jeff need to reach Allen's total?

At a local bake sale, a parent bought 7 muffins at $.40 each and 8 cookies at $.55 each. How much money did the parent pay?

Alicia's mom has $18 and needs to pay for 12 gallons of gasoline. Each gallon costs $1.38 cents. Does she have enough money?

1)



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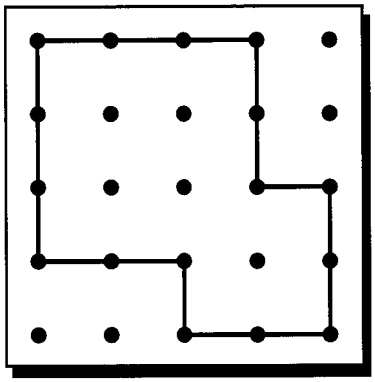

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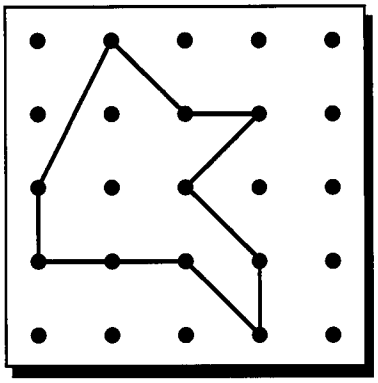

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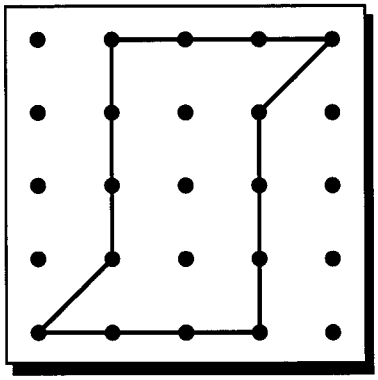

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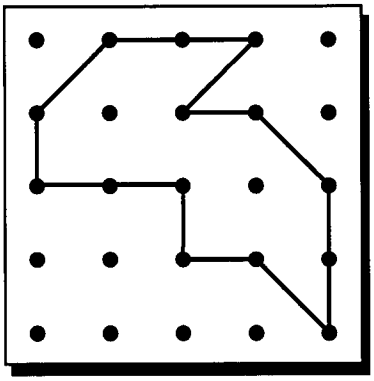

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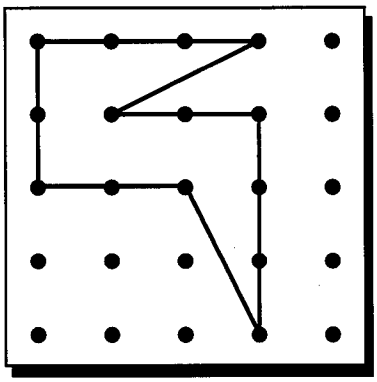

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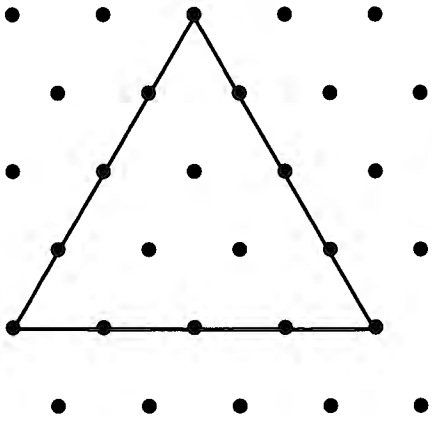

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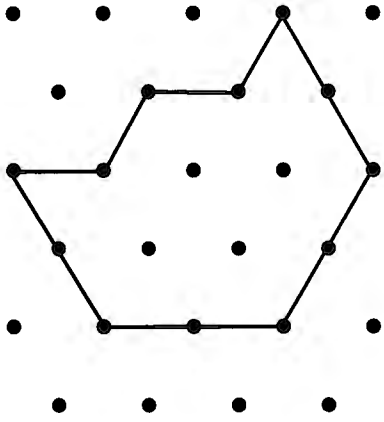

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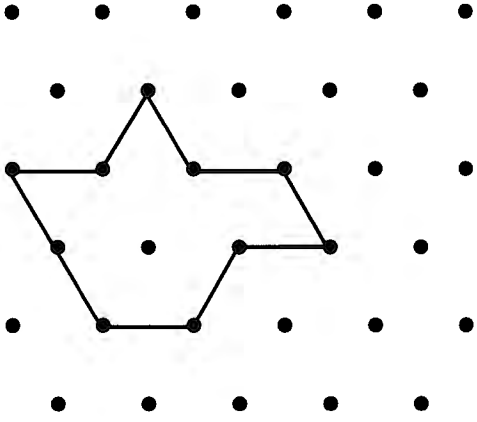
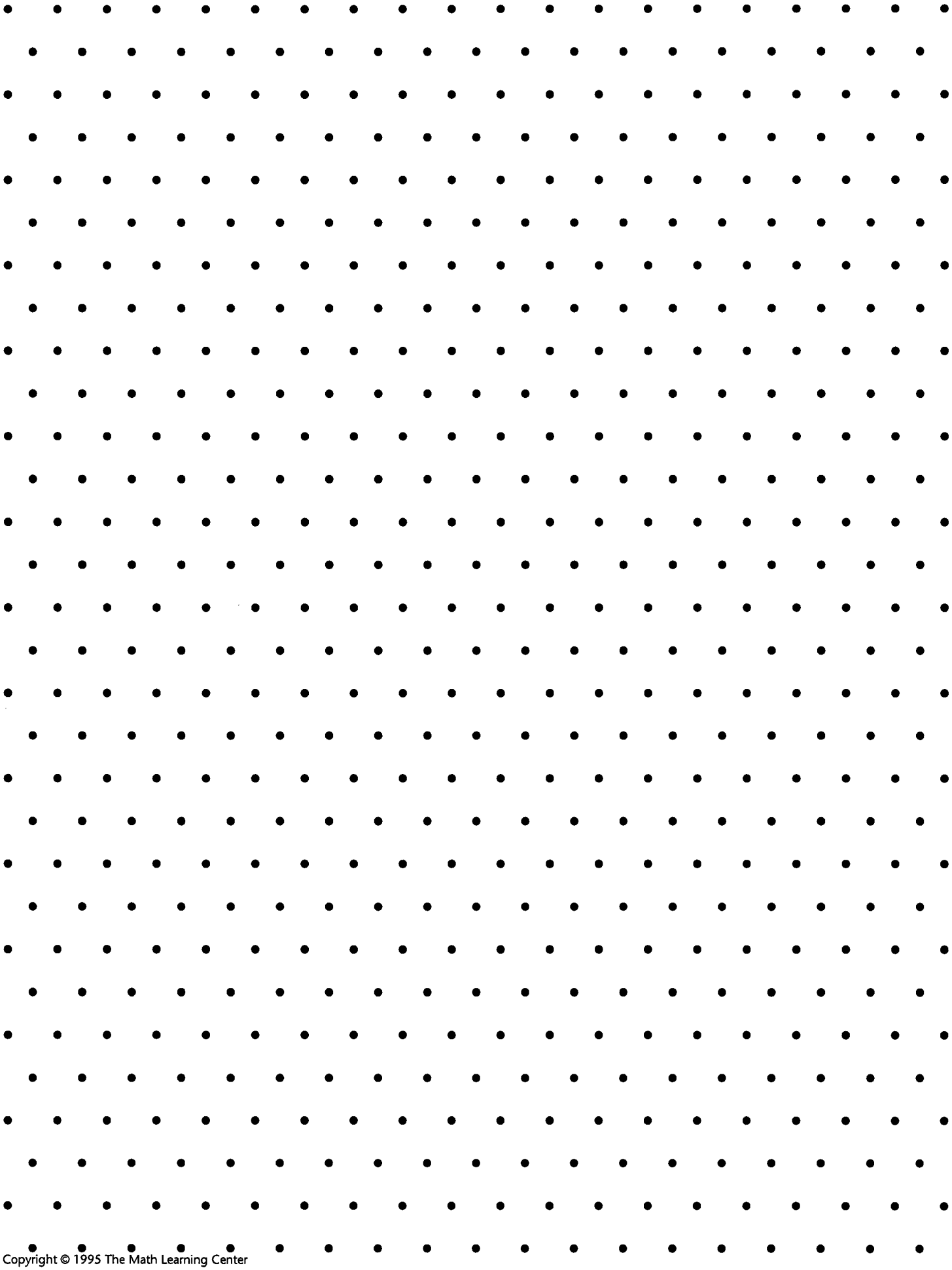
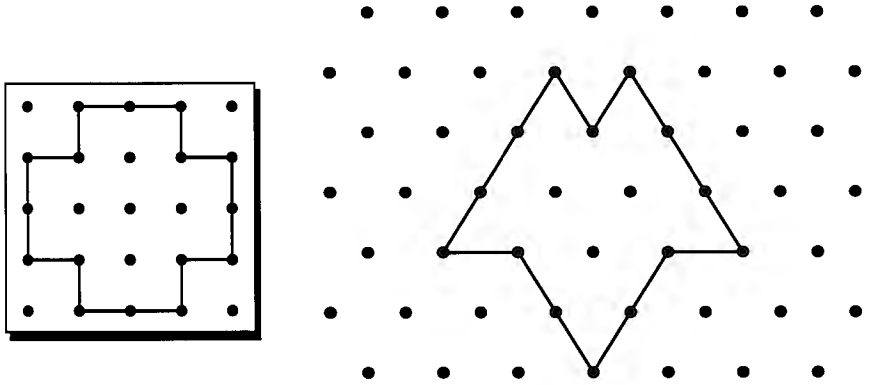
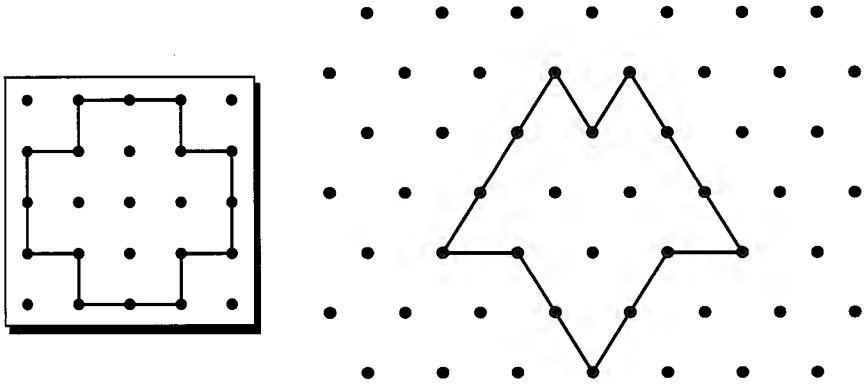




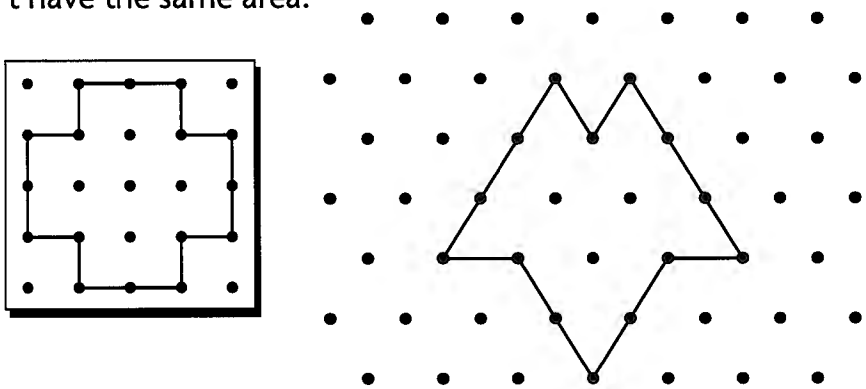
1. See if you can find some ways to split each of these shapes into two regions that have the same area and are congruent.



2. Here are the same shapes as in Problem 1. Now, see if you can find some ways to split each shape into two regions that have the same area, yet are not congruent.



3. Here are the same shapes once more. See if you can find some ways to split each shape into two regions that are congruent but don't have the same area.

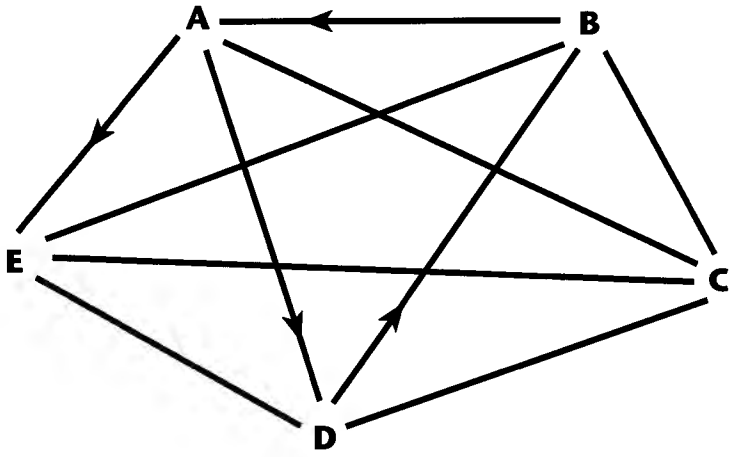


1. Five teams, A, B, C, D and E are going to play a round-robin softball tournament, where each team plays every other team exactly once. How many games will be played in this tournament? Create a display which shows the opponents in each game.

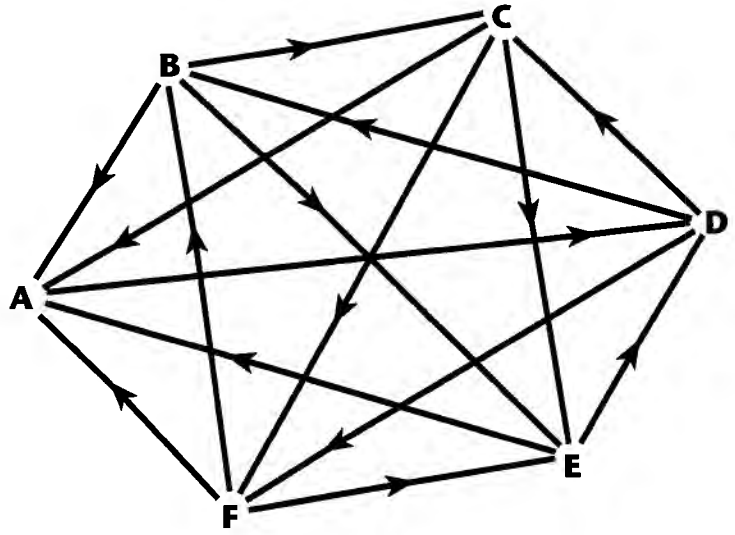
2. Suppose a sixth team, F, joins the 5 teams in Problem 1, for a round-robin tournament. How many games will be played in this 6-team tournament? Create a display which shows the opponents in each game.

3. Continue on. How many games will be played in a 10-team round-robin, where each team plays every other team exactly once? How about if there were 15 teams?

Part 1



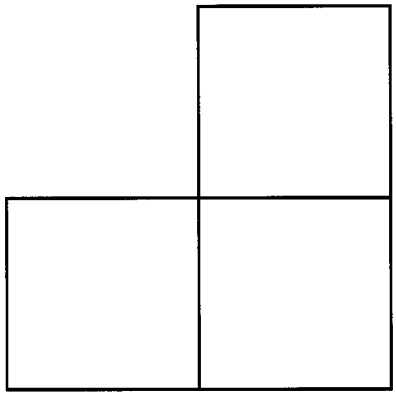
Part 2

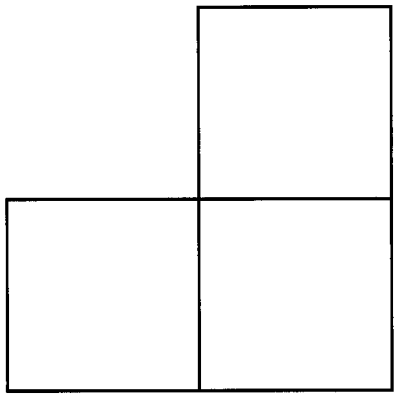


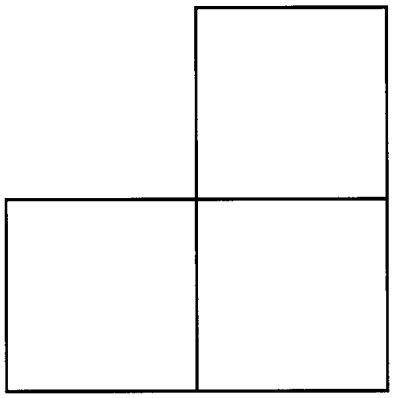
1. Suppose four people are going to compete in a Discussion Card War tournament, where each person plays every other person exactly once.

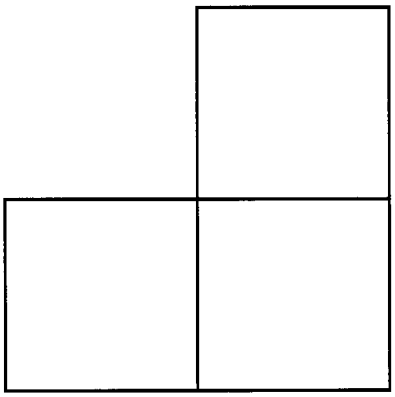
How many games will be played in this tournament? Create a display which shows the opponents in each game.

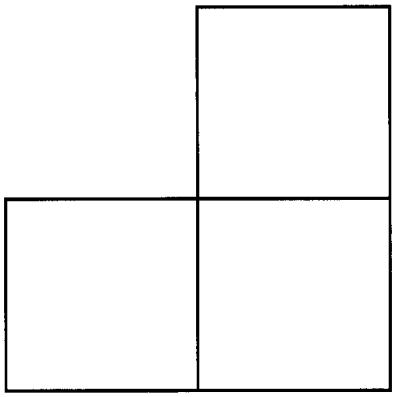
2. If each member of our class played one round of Discussion Card War with every other member, how many games would be played? Explain.

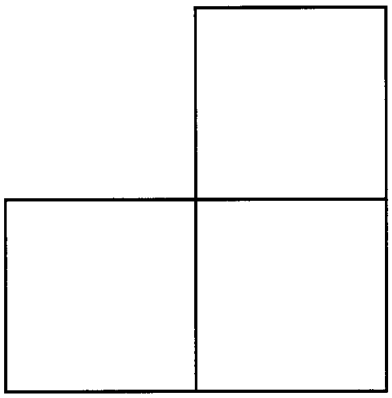












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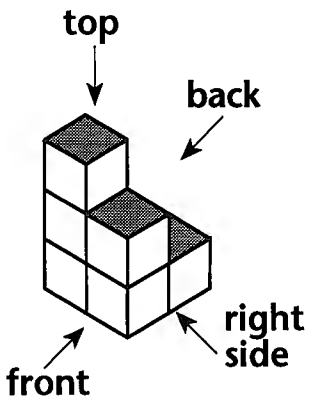

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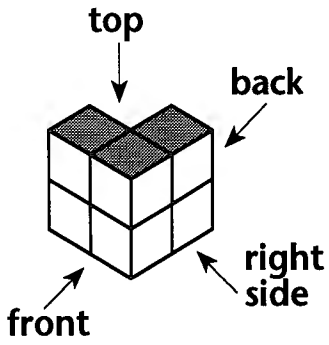

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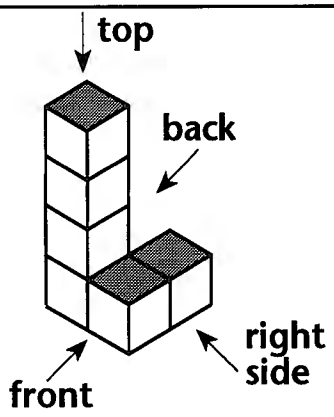

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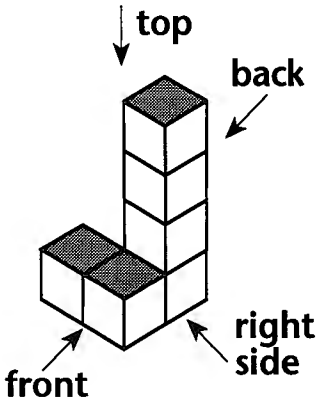

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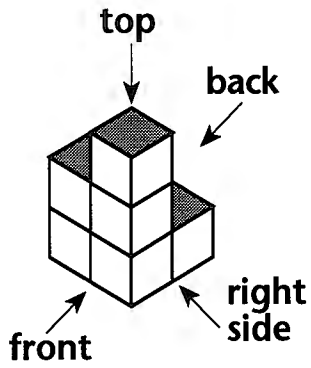

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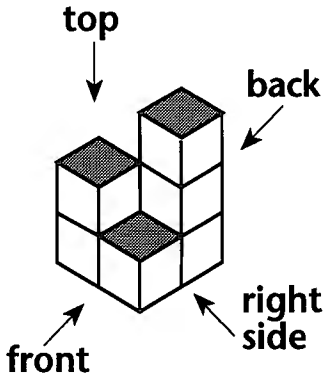

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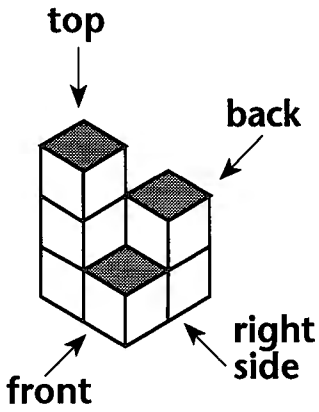

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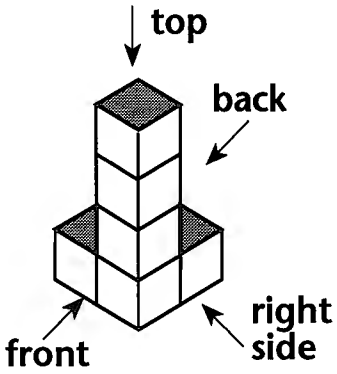

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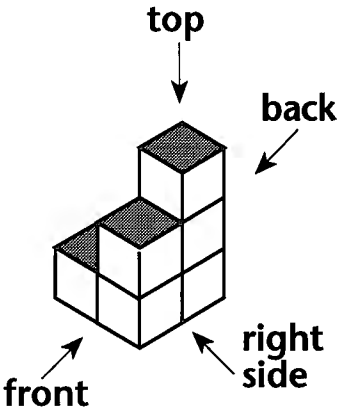

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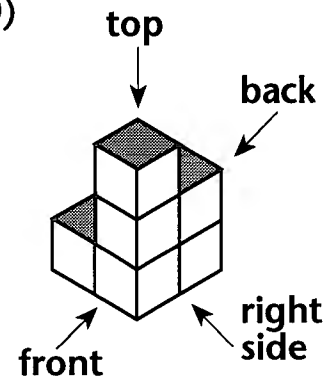


Cube Towers Recording Sheet

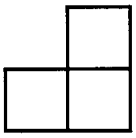
Tower 1

top view	front view	left side view	right side view	back view

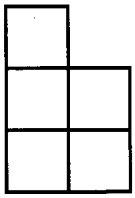
Tower 2

top view	front view	left side view	right side view	back view

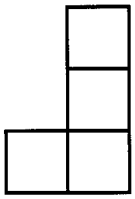
Tower 1



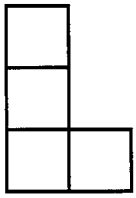
top view



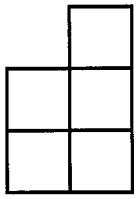
front view



left side view

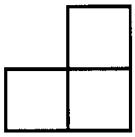


right side view

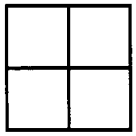


back view

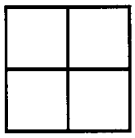
Tower 2



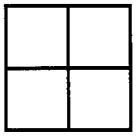
top view



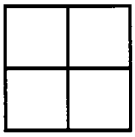
front view



left side view



right side view



back view

BACK

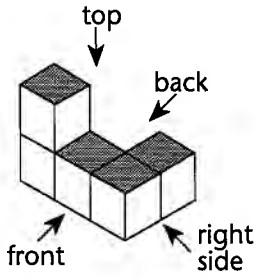
LEFT SIDE

RIGHT SIDE

FRONT

1. Use the fewest cubes possible to build each model shown below. Be sure neighboring cubes share full faces (without gaps or overlaps). Sketch (in the space provided) the top, right side and front view of each of your models.

a)

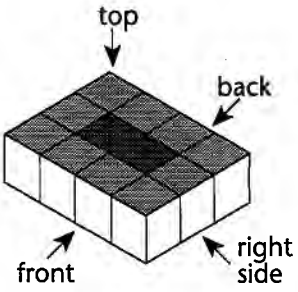


top view:

front view:

right side view:

b)

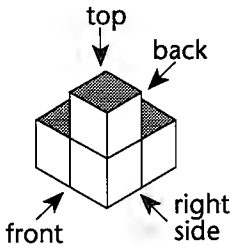


top view:

front view:

right side view:

c)

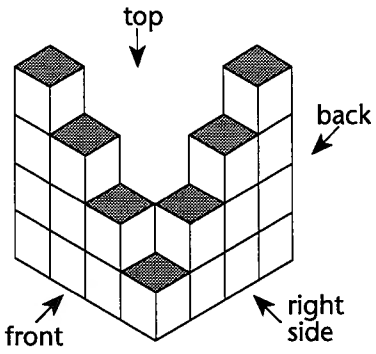


top view:

front view:

right side view:

d)

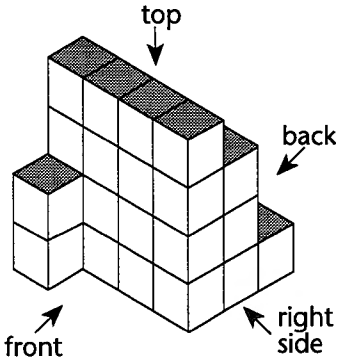


top view:

front view:

right side view:

e)



top view:

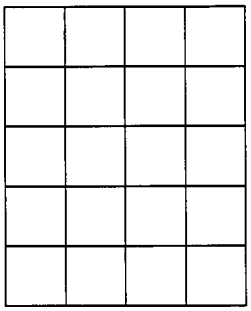
front view:

right side view:

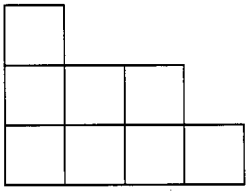
2. Sketch the left side view of your model e) above.

left side:

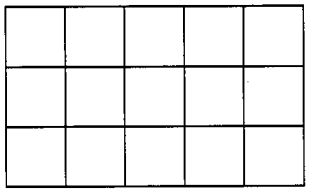
Build several different cube towers that have the views shown here.



top



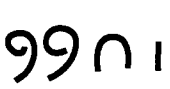
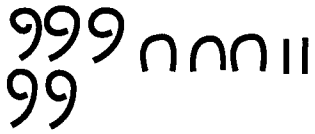
front



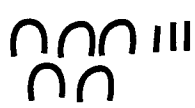
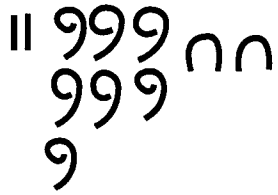
right

What is the fewest number of cubes needed to build a tower with the above views? Build this tower.

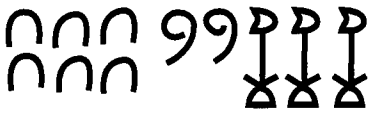
What is the largest number of cubes you can use? Build this tower.

Ancient	Modern
	6
	27
	211
	532

Column 1

Ancient	Modern
	23
	28
	128
	
	105
	
	730

Column 2

Ancient	Modern
	2313
	
	1741
	4005
	2070

Heiroglyphic Numerals		Modern Numerals
	(staff)	1
	(heelbone)	10
	(scroll)	100
	(lotus flower)	1,000
	(bent finger)	10,000
	(tadpole)	100,000
	(astonished man)	1,000,000

- Base 10
- Additive system  → 200 + 20 + 3 = 223
  Add the value of the symbols together.
- No symbol for zero.

These examples illustrate how the ancient Egyptians multiplied two numbers. Study the examples and see if your group can explain what the Egyptians did. Then create some additional examples of your own.

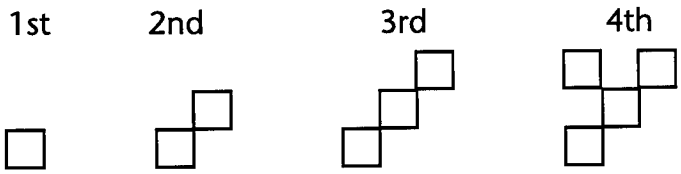
Example 1: 7 x 23

	Hieroglyphics	Modern	
✔	I	✔ 1	23
✔	II	✔ 2	___
✔	IIII	✔ 4	___
		Total	161

Example 2: 21 x 42

	Hieroglyphics	Modern	
✔	I	✔ 1	42
	II	2	___
✔	IIII	✔ 4	___
	IIII	8	___
✔	IIIn	✔ 16	___
	IInnn	32	___
		Total	___

Build the four arrangements pictured here:



a) Look for a pattern in the first four arrangements that might suggest what the 5th arrangement looks like. Describe your pattern and use it to build the 5th arrangement.

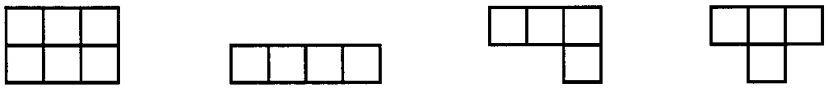
b) Imagine building more arrangements using your pattern. Describe how you would determine the number of tile needed to make the 17th arrangement.

c) Describe how you would determine the number of tile needed to make the 53rd arrangement.

d) Make a list of observations that seem to be true for all the arrangements made with your pattern.

Build the four arrangements pictured here:

1st 2nd 3rd 4th



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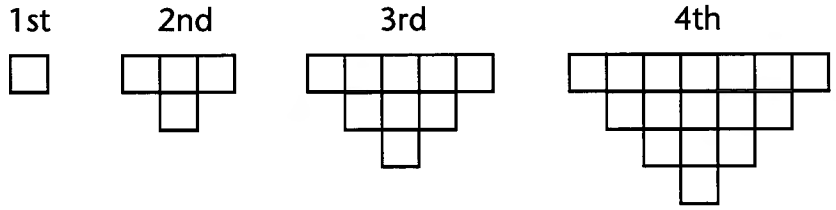
d) Make a list of observations that seem to be true for all the arrangements made with your pattern.

Build the four arrangements pictured here:



a) Look for a pattern in the first four arrangements that might suggest what the 5th arrangement looks like. Describe your pattern and use it to build the 5th arrangement.

b) Imagine building more arrangements using your pattern. Describe how you would determine the number of tile needed to make the 17th arrangement.

c) Describe how you would determine the number of tile needed to make the 53rd arrangement.

d) Make a list of observations that seem to be true for all the arrangements made with your pattern.

Build the four arrangements pictured here:

1st 2nd 3rd 4th

(toothpicks)

a) Look for a pattern in the first four arrangements that might suggest what the 5th arrangement looks like. Describe your pattern and use it to build the 5th arrangement.

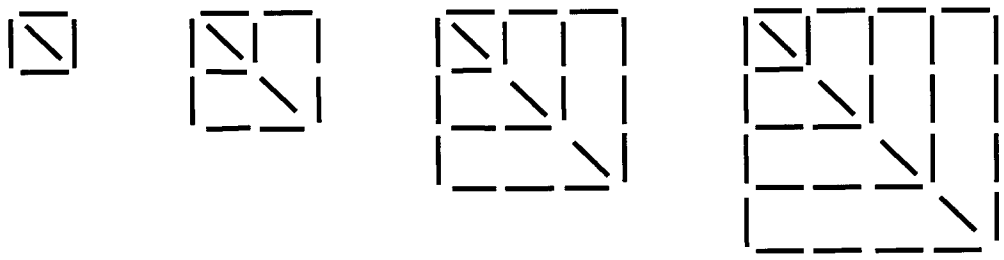
b) Imagine building more arrangements using your pattern. Describe how you would determine the number of toothpicks needed to make the 17th arrangement.

c) Describe how you would determine the number of toothpicks needed to make the 53rd arrangement.

d) Make a list of observations that seem to be true for all the arrangements made with your pattern.

Build the four arrangements pictured here:

1st 2nd 3rd 4th



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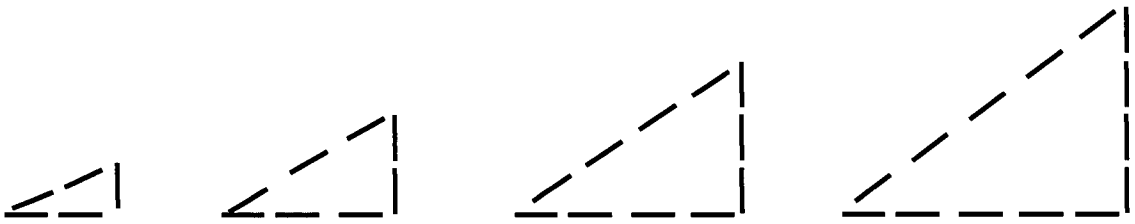
c) Describe how you would determine the number of toothpicks needed to make the 53rd arrangement.

d) Make a list of observations that seem to be true for all the arrangements made with your pattern.

Build the four arrangements pictured here:

1st 2nd 3rd 4th



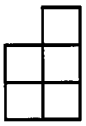
a) Look for a pattern in the first four arrangements that might suggest what the 5th arrangement looks like. Describe your pattern and use it to build the 5th arrangement.

b) Imagine building more arrangements using your pattern. Describe how you would determine the number of tile needed to make the 17th arrangement.

c) Describe how you would determine the number of tile needed to make the 53rd arrangement.

d) Make a list of observations that seem to be true for all the arrangements made with your pattern.

Build the four arrangements pictured here:

1st	2nd	3rd	4th	5th	6th	7th	8th
?			?	?	?		?

a) Look for a pattern in the first four arrangements that might suggest what the 5th arrangement looks like. Describe your pattern and use it to build the 5th arrangement.

b) Imagine building more arrangements using your pattern. Describe how you would determine the number of tile needed to make the 17th arrangement.

c) Describe how you would determine the number of tile needed to make the 53rd arrangement.

d) Make a list of observations that seem to be true for all the arrangements made with your pattern.

Build the four arrangements pictured here:

1st 2nd 3rd 4th

a) Look for a pattern in the first four arrangements that might suggest what the 5th arrangement looks like. Describe your pattern and use it to build the 5th arrangement.

b) Imagine building more arrangements using your pattern. Describe how you would determine the number of tile needed to make the 17th arrangement.

c) Describe how you would determine the number of tile needed to make the 53rd arrangement.

d) Make a list of observations that seem to be true for all the arrangements made with your pattern.

Sammy received a strange allowance. He got a nickel each day of the week except Thursday and Sunday. On those two days only, he got a dime. During which month this year will he receive the most money? How much money will he get during that month?

Draw a model or picture that illustrates your thinking. Write some sentences to describe why you chose the month you did. Show any equations that support your thinking.

During which month will Sammy receive the least amount of money? Why?

How much money will Sammy receive during the entire year from his allowance?

Name _____

Each touchdown is worth _____ points.

Each field goal is worth _____ points.

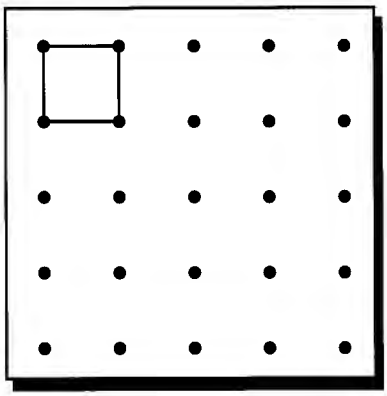
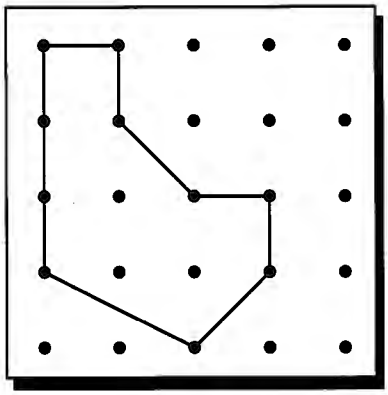
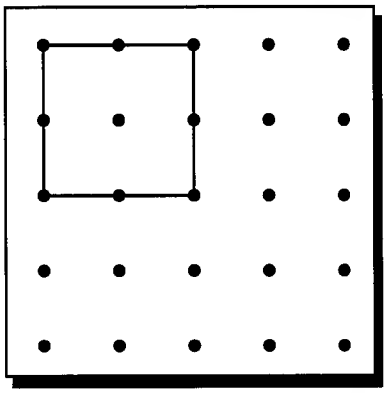
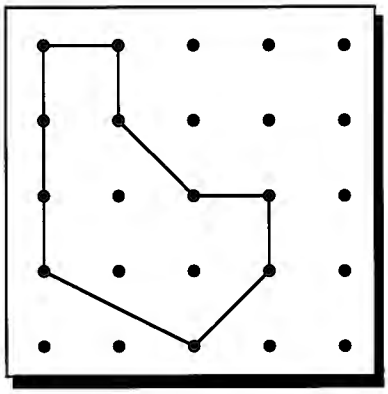
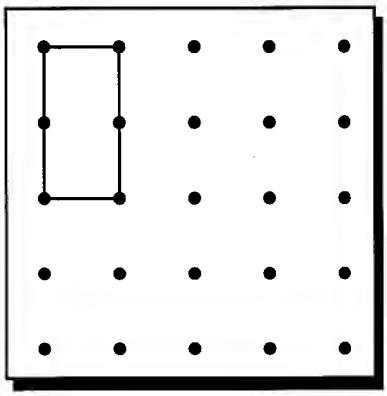
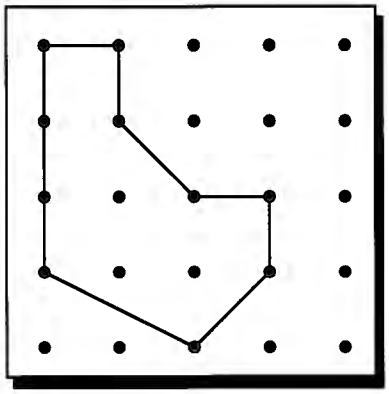
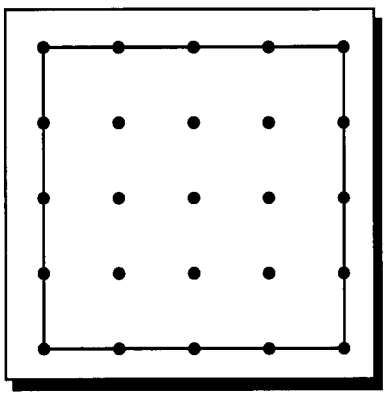
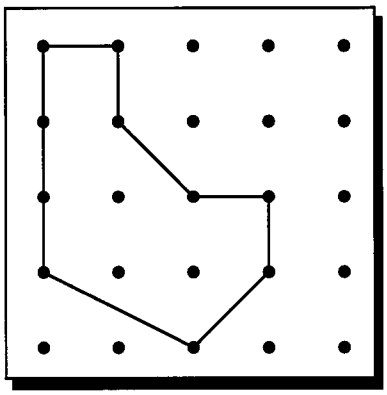
1. How many different ways, if any, can a team score a total of 92 points? List the ways.

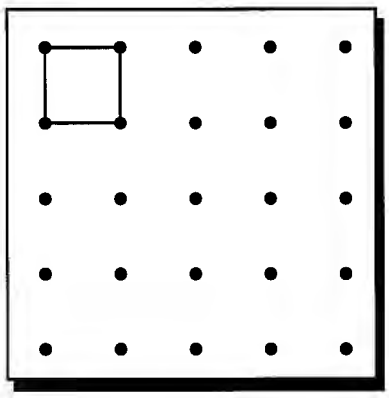
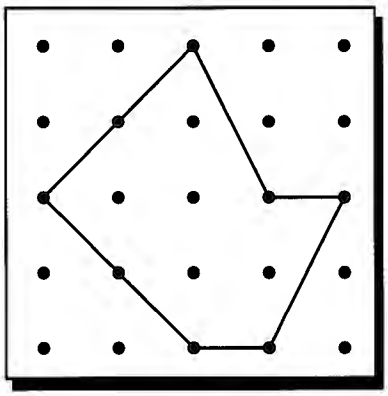
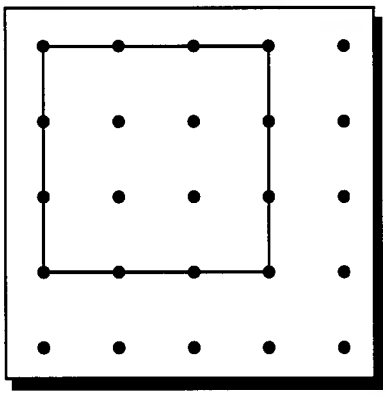
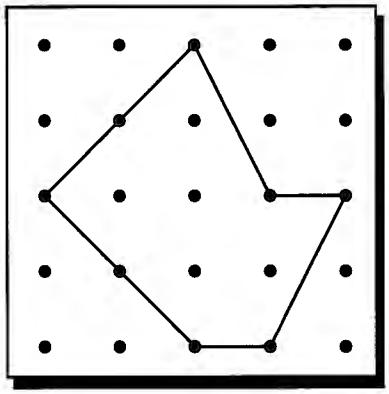
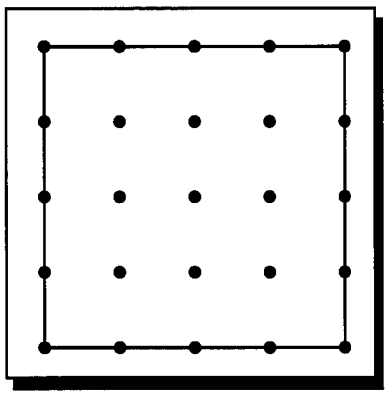
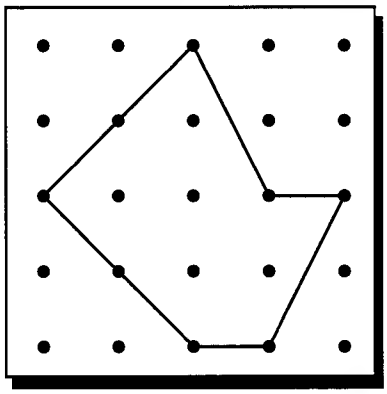
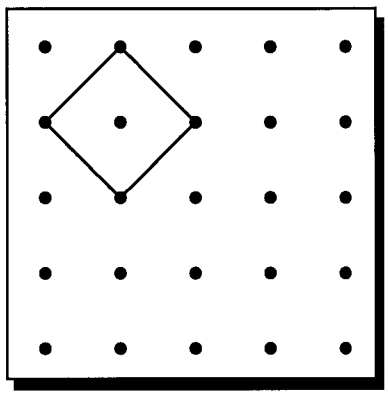
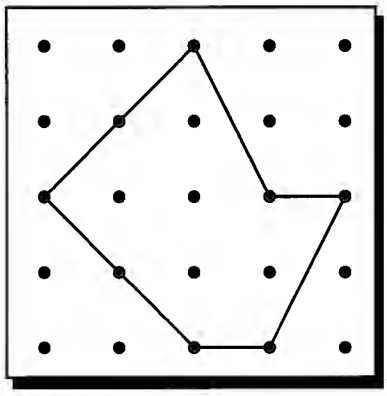
2. Think of a point total larger than 100 that can be made. List the different ways of making this total.

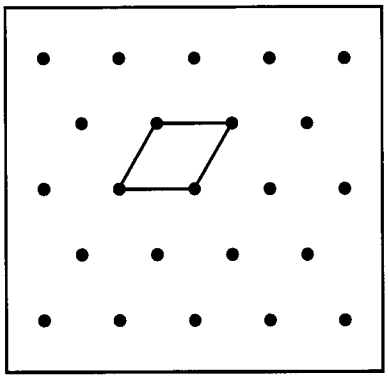
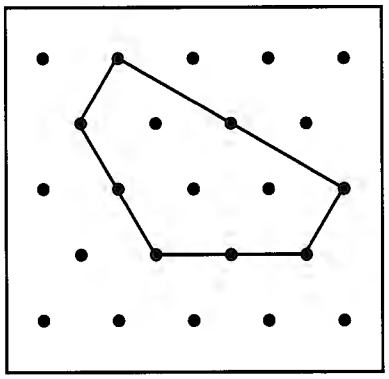
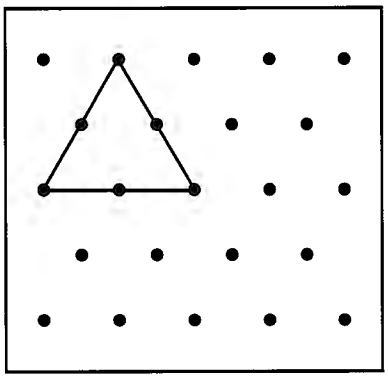
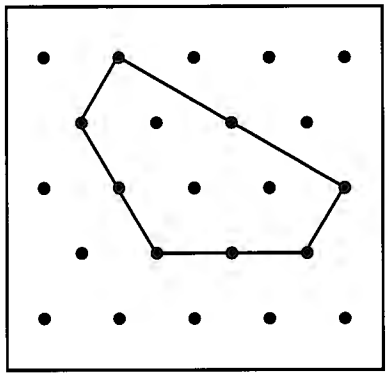
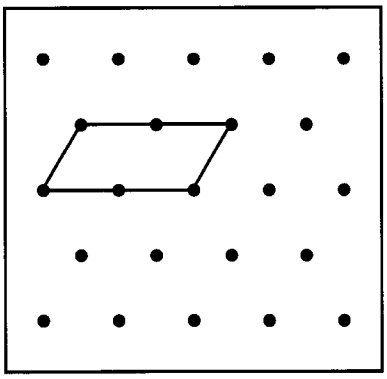
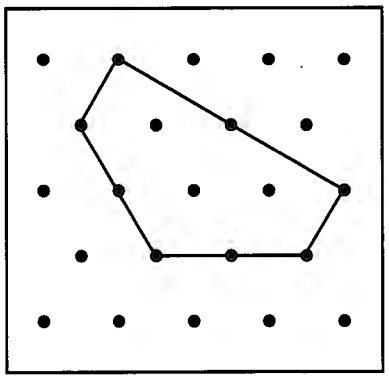
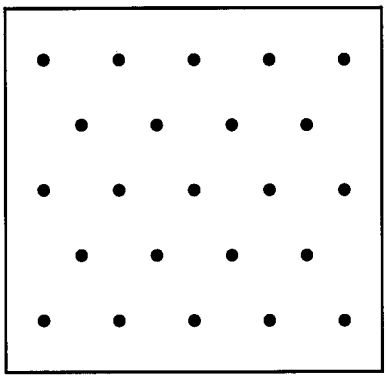
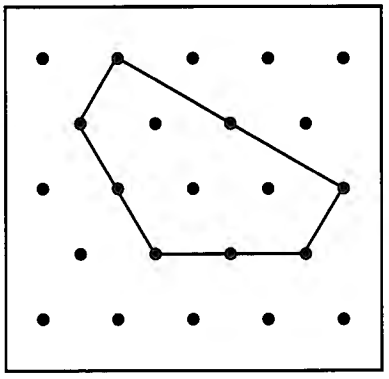
3. If possible, give at least two examples of point totals larger than 100 that can't be made. Explain the reasoning you used to arrive at your answer.

4. What observations or hypotheses do you have about point totals that can be made?

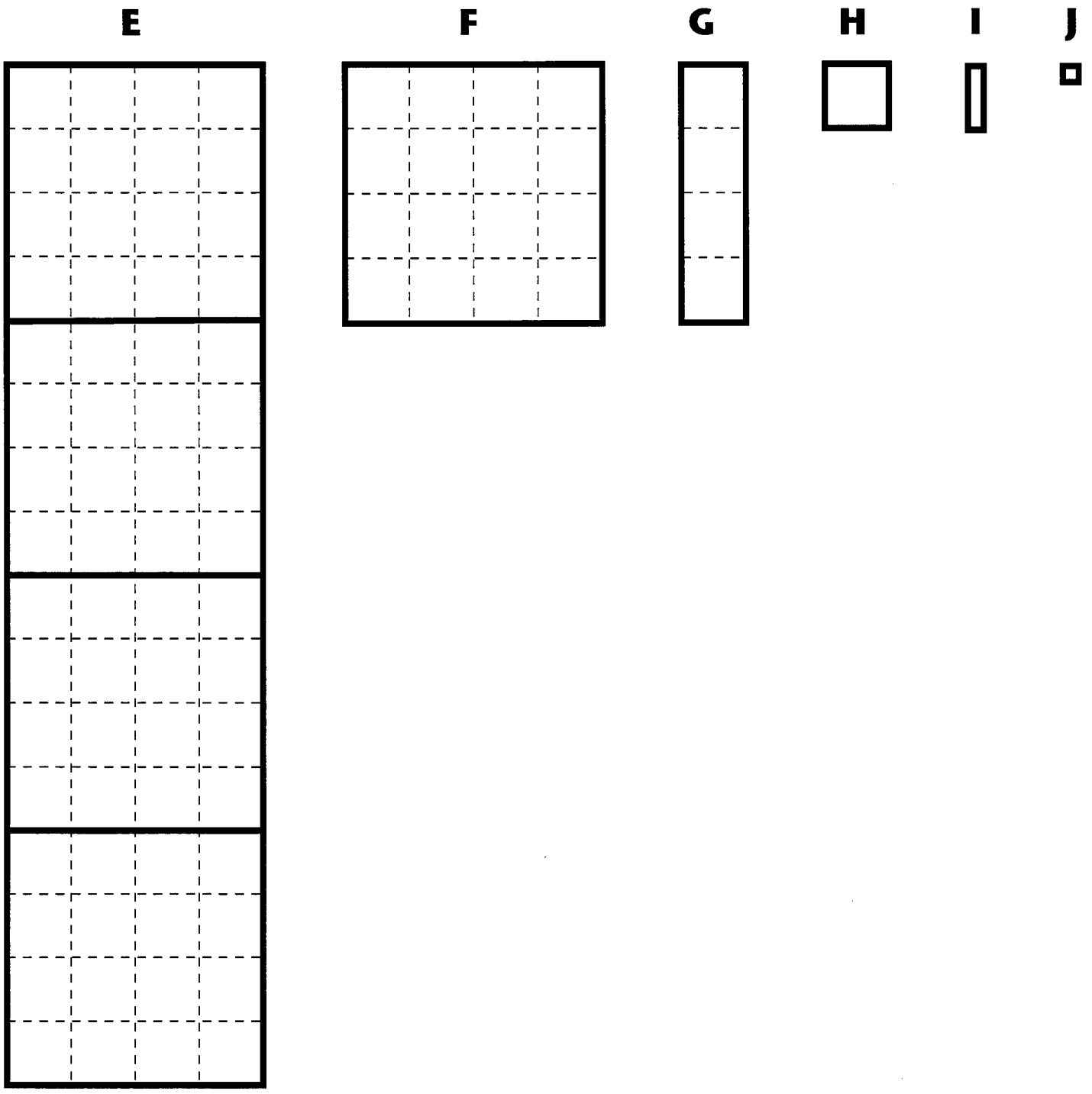
5. What observations or hypotheses do you have about point totals that can't be made?

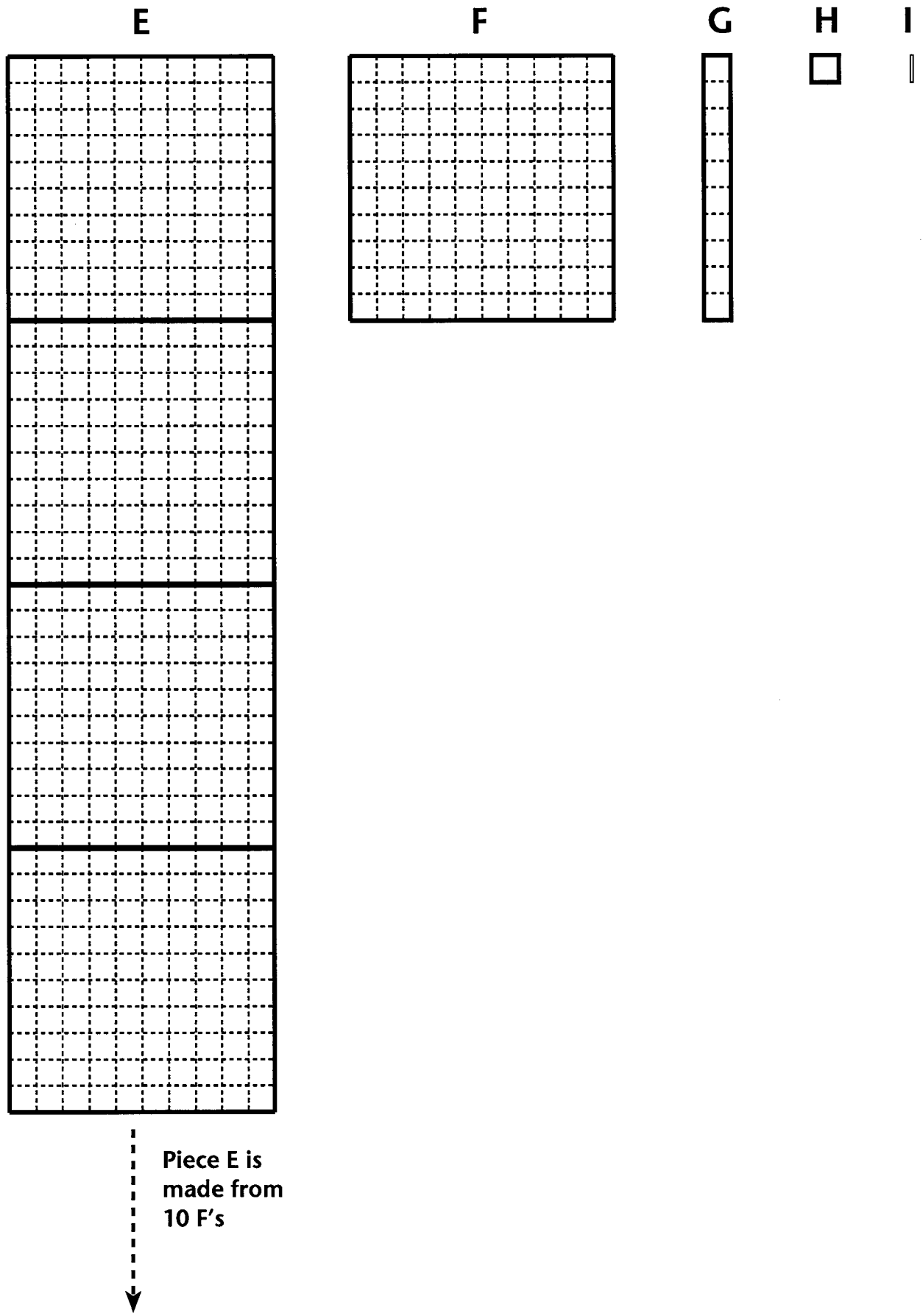
	Column 1 Unit of Area	Column 2 Shape A
a)		
b)		
c)		
d)		

	Column 1 Unit of Area	Column 2 Shape B
a)		
b)		
c)		
d)		

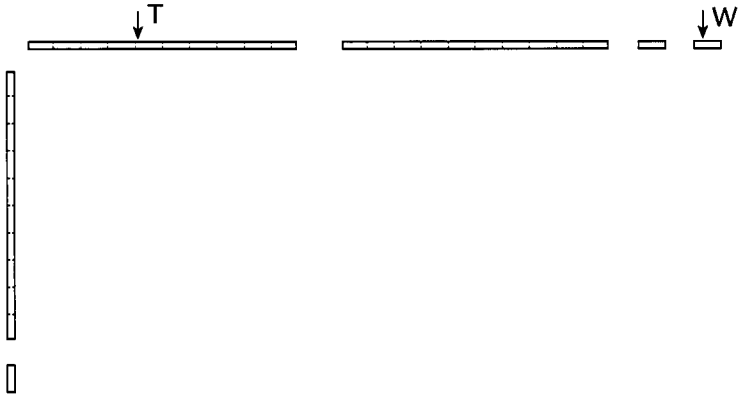
	Column 1 Unit of Area	Column 2 Shape B
a)		
b)		
c)		
d)		

student's choice





In this picture, base ten linear pieces are arranged to form the outline of a rectangle.



1. Which linear piece is the unit of length?

2. What is the perimeter of the outlined rectangle? Write a number statement that shows how you determined the perimeter.

3. What is the area of the outlined rectangle?

4. Make a sketch of the rectangle and show how to use the Distributive Law to find the area.

5. Write a story that could be modeled by the rectangle.

Please Answer "Yes" or "No" to each question.

Question 1:

Question 2:

Child	Question 1	Question 2
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
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28		
29		
30		

Please Answer "Yes" or "No" to each question.

Question 1: Do you like regular cola?

Question 2: Do you like diet cola?

Child	Question 1	Question 2
1	Yes	Yes
2	Yes	No
3	Yes	No
4	No	No
5	No	Yes
6	Yes	Yes
7	Yes	Yes
8	Yes	Yes
9	Yes	Yes
10	No	Yes
11	No	No
12	Yes	Yes
13	Yes	No
14	Yes	Yes
15	No	Yes
16	Yes	Yes
17	Yes	No
18	No	Yes
19	Yes	Yes
20	No	Yes
21	Yes	Yes
22	Yes	No
23	Yes	Yes
24	Yes	Yes
25	Yes	Yes
26	Yes	Yes
27	Yes	Yes
28	Yes	Yes
29	Yes	No
30	Yes	Yes

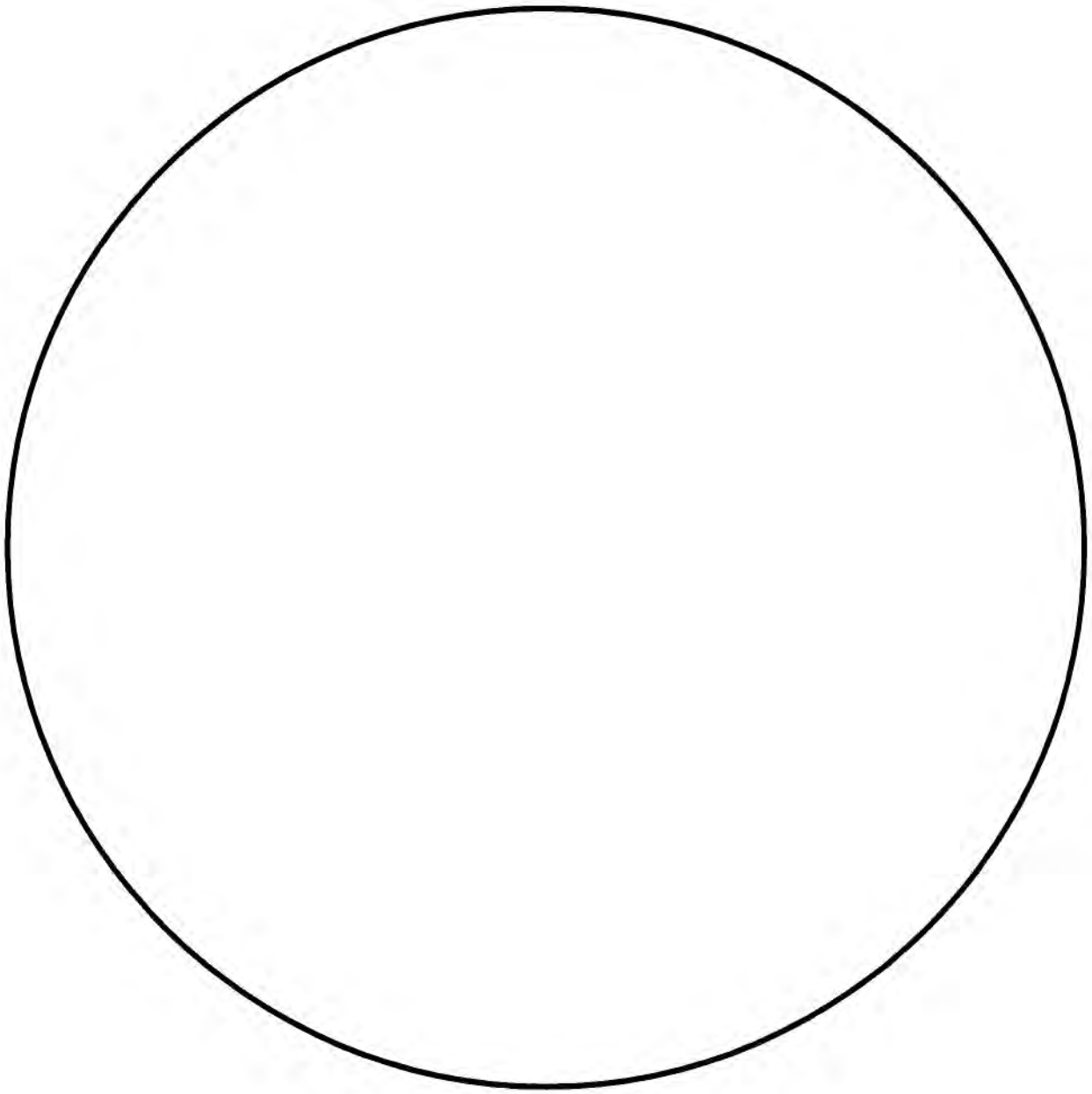
Please Answer "Yes" or "No" to each question.

Question 1: Do you like regular cola?

Question 2: Do you like diet cola?

Child	Question 1	Question 2
1	Yes	Yes
2	No	No
3	Yes	Yes
4	Yes	Yes
5	No	Yes
6	Yes	Yes
7	Yes	Yes
8	No	No
9	Yes	Yes
10	No	Yes
11	Yes	Yes
12	Yes	Yes
13	No	No
14	Yes	Yes
15	Yes	Yes
16	Yes	Yes
17	Yes	Yes
18	Yes	Yes
19	No	Yes
20	Yes	Yes
21	No	No
22	Yes	Yes
23	Yes	Yes
24	No	No
25	Yes	Yes
26	Yes	Yes
27	No	No
28	No	No
29	Yes	Yes
30	No	Yes

Name _____



1. Debby has 3 colored cubes: 1 red, 1 green and 1 blue. She wishes to arrange these 3 cubes in a line. How many different arrangements can she make?

2. Suppose Debby also has a yellow cube to put with the red, blue and green ones. How many different ways can she arrange all 4 cubes in a line?

3. In Problem 2, how many different ways can Debby select 2 of the 4 cubes and arrange them in a line?

4. Stone Soup Company makes different kinds of vegetable soups. Each kind always uses 2 vegetables that have been chosen from 5 different available vegetables.

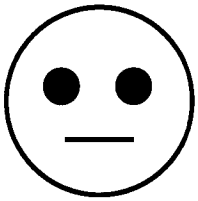
a. How many different combinations of 2 vegetables can the company form?

b. Suppose each kind of soup were made from a combination of 3 of the 5 vegetables. Now how many combinations can be formed?

c. How many combinations are possible if 4 vegetables are used? How about if 5 vegetables are used?

GROUP ASSESSMENT

1. How do you feel about your product?


Explain your rating.

2. How do you feel about your group as learners in this activity?



Explain your rating.

WE ARE PROUD OF:

WE WISH:

IF WE GET TO REVISE THIS PIECE, WE WILL:

WE LEARNED: (use back of page)

1. One day Amy wrote the letters of her name like this:

```
   A
  M M
 Y Y Y
```

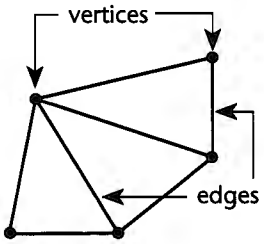
She said her name could be spelled in 4 ways by following different paths. Her friend, Sally, found 6 different paths for spelling Amy. Both girls used this rule: Each path starts with the letter in the top row, goes to a letter in the second row, then to one in the third row. Can you figure out how each girl arrived at her answer?

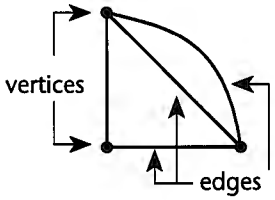
2. Debby wrote the letters of her name in a triangular arrangement, too.

```
    D
   E E
  B B B
 B B B B
Y Y Y Y Y
```

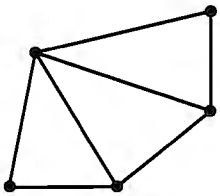
If Debby forms paths like Amy and Sally did, how many ways can she find to spell her name?

All of the designs on this sheet consist of edges joined by vertices.



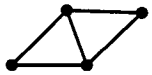


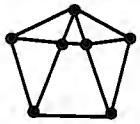
1. Here's a puzzle that's fun to try. Karl claims he can trace this entire design without lifting his pencil and without going over any edge more than once. Can you do the same?

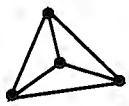


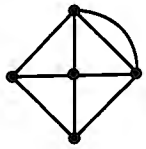
2. Some of the designs in this problem can be traced just as you did in Problem 1 and some can't be. See if you can identify the designs that can be traced. Remember no edge can be traced more than once and your pencil can't be lifted from the paper.

a) 

b) 

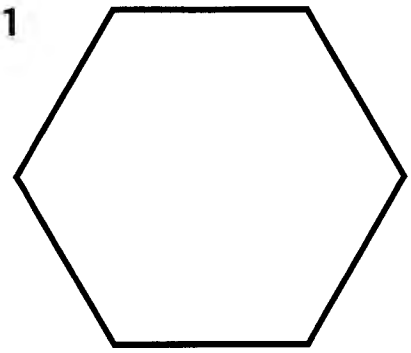
c) 

d) 

e) 

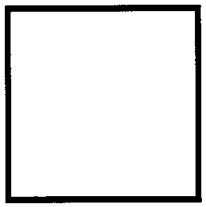
3. Create two designs—one that can be traced under the rules of Problems 1 and 2 and one that can't be. However, do not label which is which! Instead, offer your designs to some friends and see if they can predict which design can be traced.

1



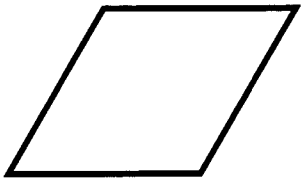
yellow hexagon

2



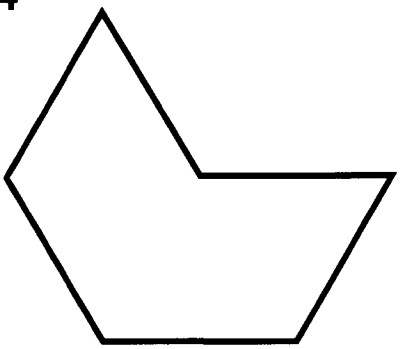
orange square

3



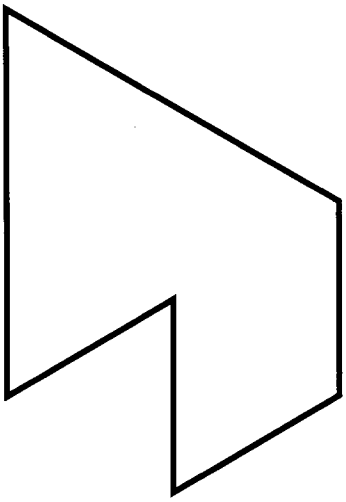
blue rhombus

4



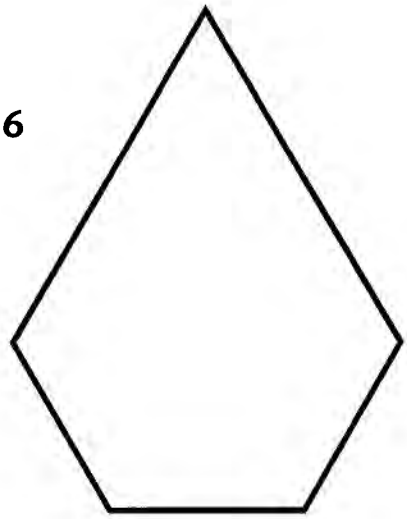
2 blue rhombuses

5



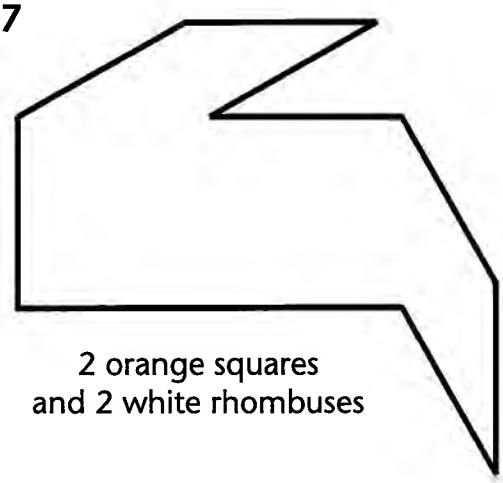
2 red trapezoids

6



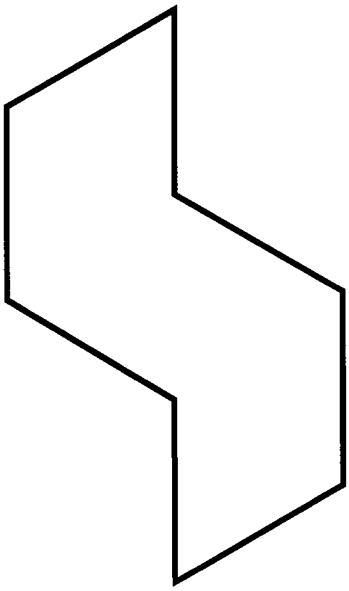
yellow hexagon and
green triangle

7



2 orange squares
and 2 white rhombuses

8



2 red trapezoids

Create at least one pattern block design for each category. Make each design with at least 4 blocks. Note: The blocks don't have to be different.

Category 1: Reflective symmetry only.

Category 2: Rotational symmetry only.

Category 3: No symmetry at all.

Category 4: Both reflective and rotational symmetry.

Category 5: Rotational symmetry of order 3.

LITTLE HOUSE IN THE BIG WOODS

by

Laura Ingalls Wilder

Chapter 10: Summertime

Sometimes Ma let Laura and Mary go across the road and down the hill, to see Mrs. Peterson. The Petersons had just moved in. Their house was new, and always very neat, because Mrs. Peterson had no little girls to muss it up. She was a Swede, and she let Laura and Mary look at the pretty things she had brought from Sweden—laces, and colored embroideries, and china.

Mrs. Peterson talked Swedish to them, and they talked English to her, and they understood each other perfectly. She always gave them each a cookie when they left, and they nibbled the cookies very slowly while they walked home.

Laura nibbled away exactly half of hers, and Mary nibbled exactly half of hers, and the other halves they saved for Baby Carrie. Then when they got home, Carrie had two half-cookies, and that was a whole cookie.

This wasn't right. All they wanted to do was to divide the cookies fairly with Carrie. Still, if Mary saved half her cookie, while Laura ate the whole of hers, or if Laura saved half, and Mary ate her whole cookie, that wouldn't be fair, either.

They didn't know what to do. So each saved half, and gave it to Baby Carrie. But they always felt that somehow that wasn't quite fair.

As a group:

1. Restate the problem in your own words.
2. Use pattern blocks to design a Swedish cookie.
3. Solve the problem using your cookies as the model.
4. Write a letter to Mary and Laura describing your interpretation of the problem and your solution. You may need to justify your reasoning.
5. Use pattern block paper to illustrate your letter.
6. Create another problem that could be solved in a similar manner.
7. Be prepared to share your product with the class. Your presentation should include show-and-tell at the overhead projector.

Mary and Laura were offered the choice between receiving a nickel a day for a whole year or $25. What choice would you recommend to them? Why?

Support your answer with a model or picture. Write some sentences and equations to explain your thinking.

1. Tape 2 cubes together. Create several covers for this solid from single pieces of paper. Each cover is to have no gaps and no overlaps.

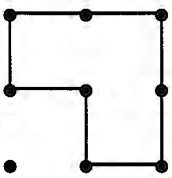
2. Create a solid shape by taping 3 or more cubes together. What covers can you make which have no gaps and no overlaps?

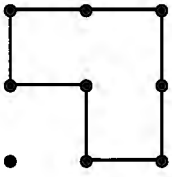
3. Suppose you work in a cube-making factory and your job is to determine how to wrap 24 cubes with a cover that has no gaps and no overlaps. What cover would you make that uses the most paper possible? What cover would you make that uses the least amount of paper possible?

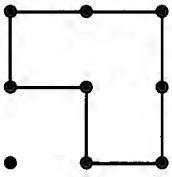
4. Write a letter which explains why you chose the two covers you made in Part 3 above.

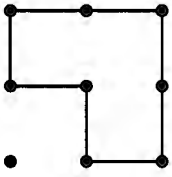
Figure A

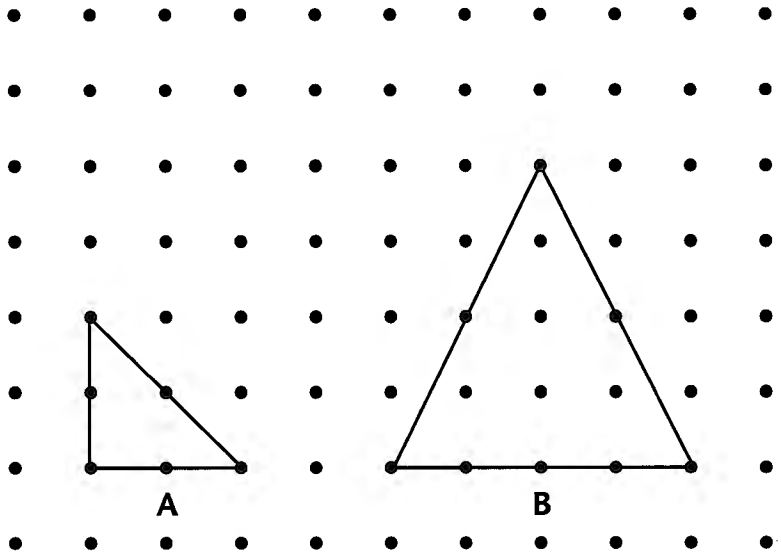
Large Figures

a) 

b) 

c) 

d) 

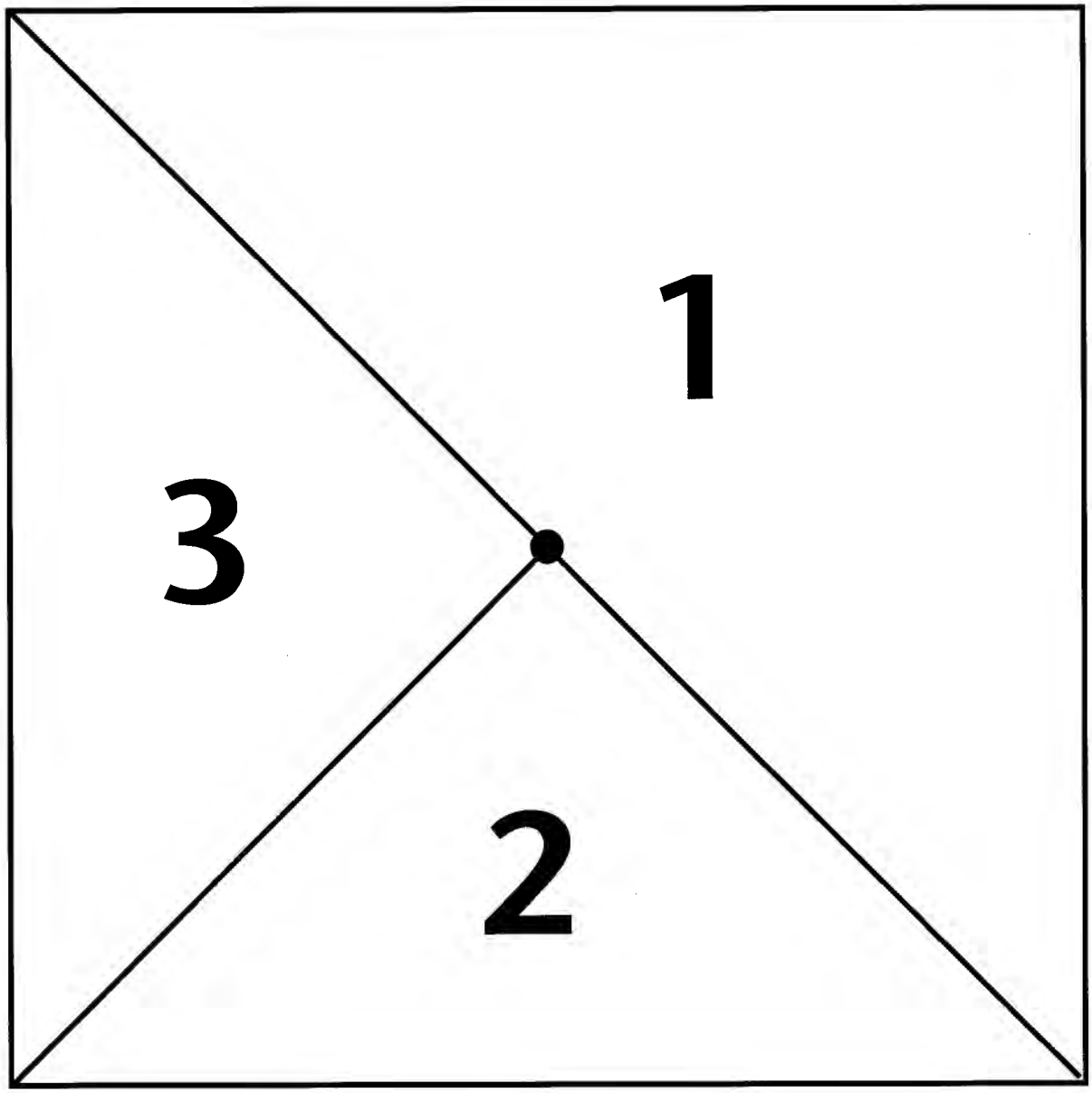


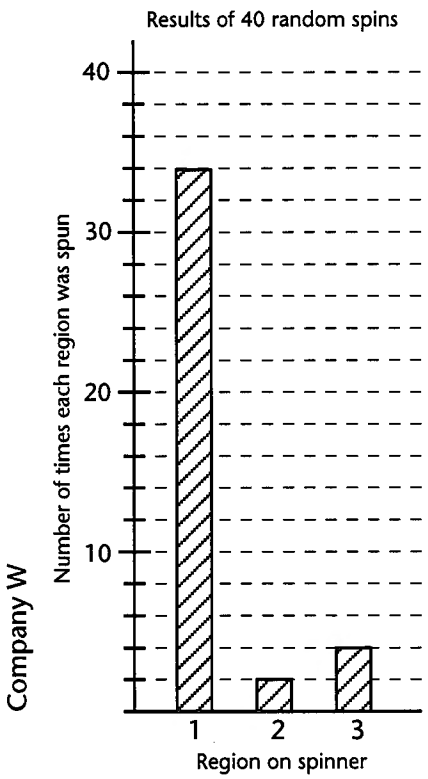
1. You just determined the perimeter of a room that has the shape of a rectangle. Make a sketch of this rectangle and describe how you found its perimeter. How can you calculate the area of the room?

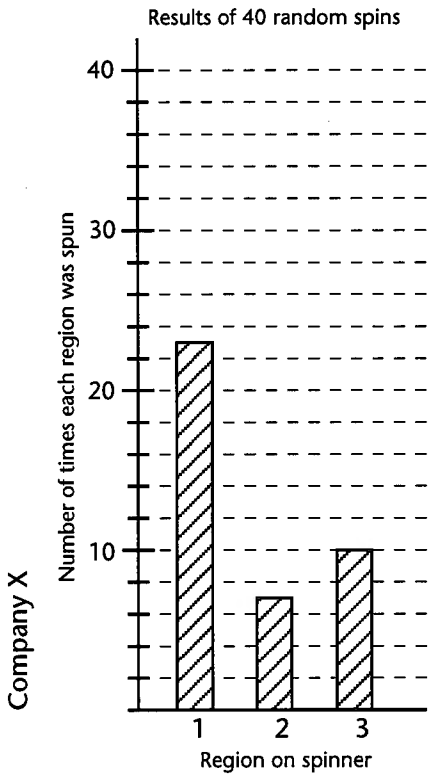
2. Make a scale model of the floor of your room on centimeter graph paper.

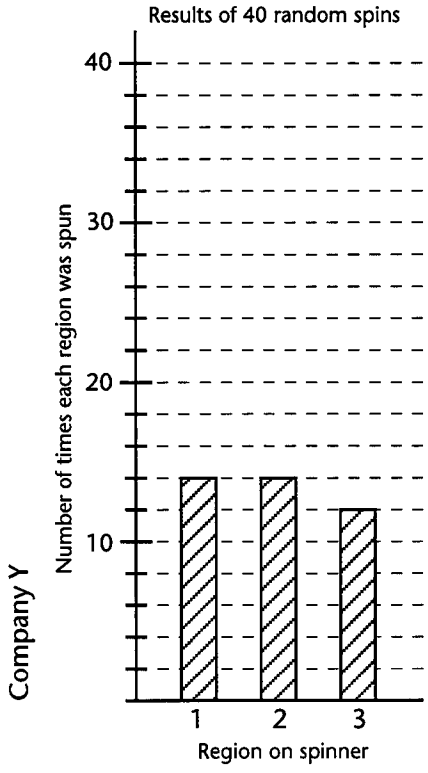
3. Imagine cutting one dimension of the room in half and making a new rectangular room with the same area. What would be the dimensions of the new room?

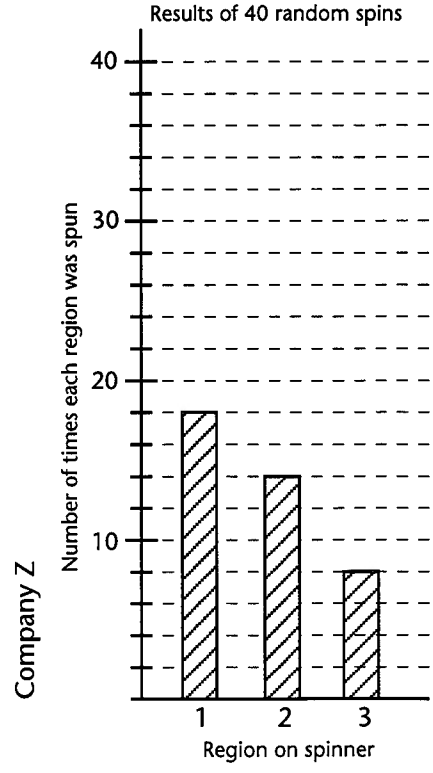
4. Suppose you keep making new rectangular rooms by cutting a dimension in half but keeping the area the same. What can be said about the dimensions of the new rooms?











Representatives from four companies (W, X, Y, and Z) each make this claim: "I made 40 random spins of spinner A and the results are shown on my company's graph." Examine each graph and answer the following questions.

1. How do you feel about each claim? Explain your reasoning.

2. Is it possible that the results on each graph could have come from 40 random spins of the spinner? Explain.

3. Think about the graphs from each company. In your opinion, which category in the following chart best describes the results shown on each graph? Mark each choice with the company's letter.

Not likely to come from 40 random spins of spinner A	Somewhat likely to come from 40 random spins of spinner A	Highly likely to come from 40 random spins of spinner A

4. Explain the reasoning behind your choices in Question 3.

Examine the spinner and each of the graphs you've been given and then discuss these questions with your partner. Record your observations in the space provided.

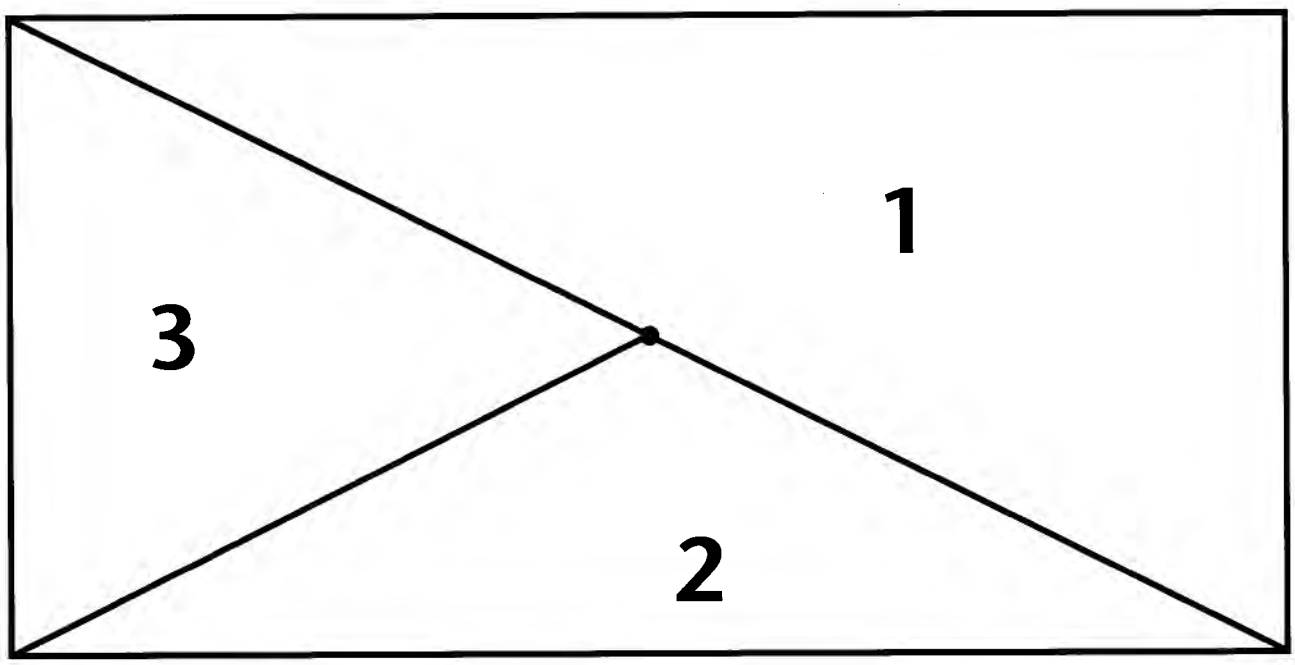
1. How do you feel about each claim? Explain your reasoning.

2. Is it possible that the results on each graph could have come from 40 random spins of the spinner? Explain.

3. Think about the graphs from each company. In your opinion, which category in the following chart best describes the results shown on each graph? Mark each choice with the company's letter.

Not likely to come from 40 random spins of spinner B	Somewhat likely to come from 40 random spins of spinner B	Highly likely to come from 40 random spins of spinner B

4. Explain the reasoning behind your choices in Question 3.

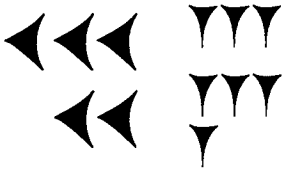


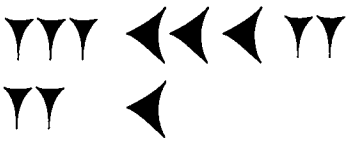
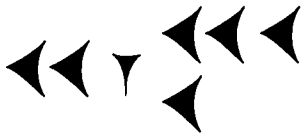
Create a spinner of your own and make three graphs (of 40 random spins) labeled as shown here:

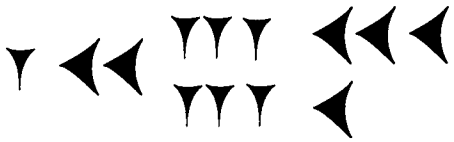
1st graph: These results are not likely to come from my spinner.

2nd graph: These results are somewhat likely to come from my spinner.

3rd graph: These results are very likely to come from my spinnner.

Ancient	Modern
	23
	57
	83
	100

	Babylonian	Modern
a)		143
b)		342
c)		248
d)		
e)		
f)		2423

	Babylonian	Modern
g)		3661
h)		5200
i)		7234
j)		7472
k)		3627
l)		750
m)		12½
n)		a number of your choice

When two numbers are added, the result is 52. When the same two numbers are subtracted, the difference is 16.

Develop some strategies for determining the two numbers.

Problem 1. Write these numbers on the front and back sides of two slips of paper. You can show four sets of numbers by placing the papers on the table in different ways. Write the sum of each set of numbers in the space provided.

	1st paper	2nd paper	
Front	4	7	
			Sums:
Back	12	20	

Do the same in Problems 2 and 3.

Problem 2.	1st paper	2nd paper	
Front	8	5	
			Sums:
Back	15	12	

Problem 3.	1st paper	2nd paper	
Front	14	25	
			Sums:
Back	68	37	

Problem 4. Here are the sums. What are the numbers?

	1st paper	2nd paper	
Front			
			Sums: 9, 12, 11, 14
Back			

Problem 5. Here are some more sums. What are numbers for each?

1st paper 2nd paper

Front

Sums: 22, 32, 20, 30

Back

1st paper 2nd paper

Front

Sums: 56, 63, 51, 58

Back

1st paper 2nd paper

Front

Sums: 140, 196, 183, 239

Back

Problem 6. Make up some puzzles for your friends or family.

1st paper 2nd paper

Front

Sums:

Back

1st paper 2nd paper

Front

Sums:

Back

Can you make one a puzzle that uses three slips of paper?

Here are some more puzzles, only this time the numbers on the papers are multiplied. The first one is done for you.

1.

	1st paper	2nd paper	
Front	3	4	
			Products: 12, 36, 36, 48
Back	9	12	

2. What are the products?

	1st paper	2nd paper	
Front	12	5	
			Products:
Back	6	15	

3. What are the numbers? How many answers can you find?

	1st paper	2nd paper	
Front			
			Products: 60, 180, 30, 90
Back			

4. Find a solution to Problem 3, where one of the front numbers is $^1/_2$.

	1st paper	2nd paper	
Front			
			Products: 60, 180, 30, 90
Back			

5. Try this one. What are the numbers?

	1st paper	2nd paper	
Front			
			Products: 112, 336, 224, 672
Back			

6. Make up a puzzle for a friend or family member.

Roll 'em, Roll 'em, Roll 'em—ICE CREAM!

from Jane Bailey

2 cups of Half-and-Half
½ cup sugar
1 tsp vanilla

Put all 3 ingredients into a 1-pound coffee can with a plastic lid. Put this can inside a 3-pound coffee can. Layer around it with ice and rock salt. Secure a lid on the 3-pound can.

Roll the 3-pound can back and forth on the floor to a partner for 10 minues.

Remove the lid and drain off the ice water. Remove the inside can and its lid. The outer edges will be firm and the inside still soupy. Stir the ice cream with a rubber spatula and put the lid on again.

Place the smaller can inside the 3-pound can once more, layer it with ice and rock salt, and seal with its lid. Roll 5–10 minute more.

The ice cream is now ready to eat. This recipe serves 4 people.

PLAY DOUGH RECIPE

from Mary Lou Horn

This is a play dough recipe similar to the commercial type and more durable. Keep in a plastic bag or closed container when not being used.

1 cup flour
1 cup water
1 Tbl oil
1 Tbl alum
½ cup salt
2 Tbl vanilla
food coloring

Mix all dry ingredients. Add oil and water. Cook over medium heat, stirring constantly until it reaches the consistency of mashed potatoes. Remove from heat and add vanilla. Divide into balls and work in food coloring by kneading.

Question: How could you make playdough if you only had ½ Tbl alum? Rewrite the recipe to show correct proportions.

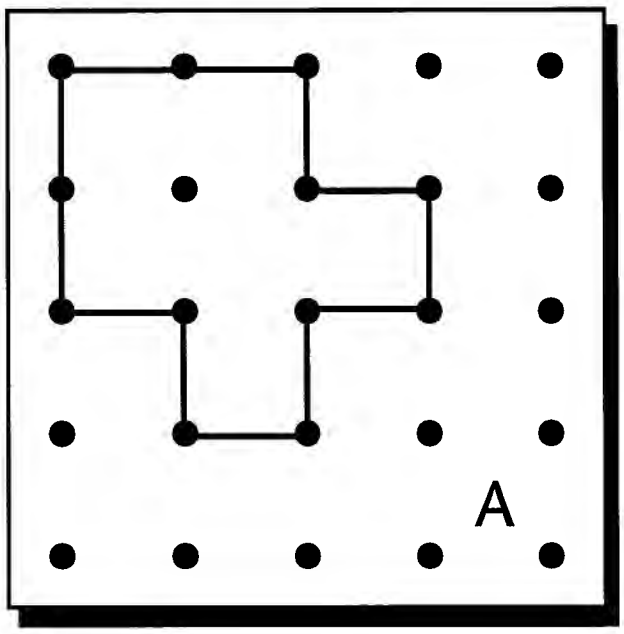
FINGER PAINTS

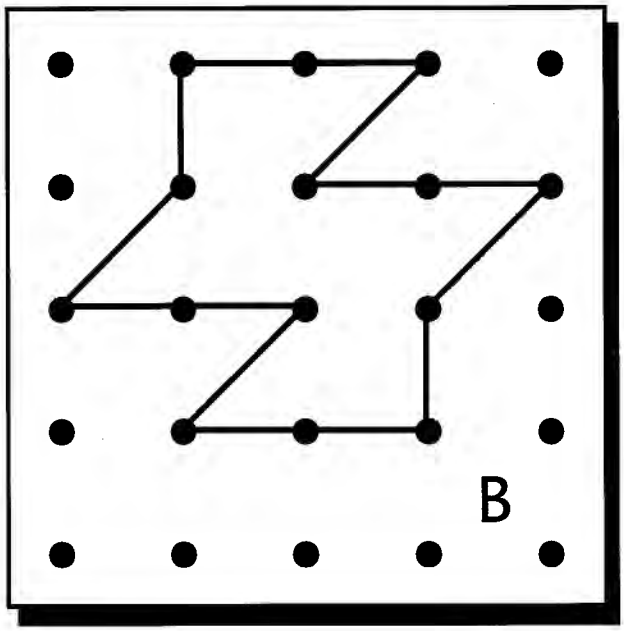
from Mary Lou Horn

1½ Tbl sugar
¼ cup cornstarch
1 cup cold water
food coloring

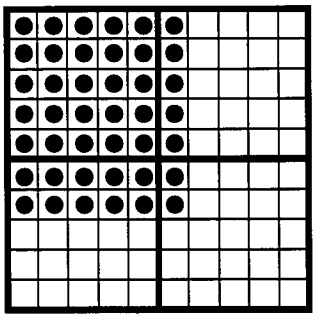
Mix the first two ingredients and then add the water. Cook over a low heat, stirring constantly until well blended. Divide the mixture into 4 or 5 portions and add a different food coloring and a pinch of detergent to each. The detergent facilitates cleaning up.

Question: Suppose you were mixing fingerpaint for a scout troop project. You need to triple the recipe above to have enough finger paint for your troop. Rewrite the recipe ingredients to reflect this change.





Examine this picture of a Discussion Card.



Problems:

1. Choose a unit of area and determine the dimensions and area of the shaded array. Explain your thinking.

2. Do the same as in Question 1 for other units of area. Identify the unit of area in each case.