2007

Green River

Regional Educational Cooperative

GRADE 6

MATHEMATICS

Measured Progress

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Note: Each item is aligned to a standard, but does not necessarily measure the entire standard.

Item 1 Ron's Birds

Standard: MA-06-2.2.01: Systems of Measurement – Students will convert units within the same measurement system and use these units to solve real-world problems.

Bloom's Taxonomy: Application

Depth of Knowledge: Level 2

1. Ron's class is studying birds. He has been looking up information about hummingbirds, chickens, and ostriches. He found that the hummingbird, which is about two inches tall, is one of the world's smallest birds. The ostrich, which is about eight feet tall, is the world's largest bird.

   a. About how many hummingbirds would it take to be as tall as an ostrich? Show how you found your answer.

   Ron also read that an ostrich egg is eight inches long and 30 times heavier than a chicken egg.

   b. If a chicken egg weighs an eighth of a pound, what is the weight of an ostrich egg? Show how you found your answer. (NOTE: 1 pound = 16 ounces)

Ron's Birds

Scoring Guide

Score	Description
4	The student response demonstrates an exemplary understanding of the concepts involved in solving problems involving customary units.
3	The student response demonstrates a good understanding of the concepts involved in solving problems involving customary units. Although there is significant evidence that the student was able to recognize and apply the concepts involved, some aspect of the response is missing or flawed. As a result the response merits 3 points.
2	The student response demonstrates a fair understanding of the concepts involved in solving problems involving customary units. While some aspects of the task are completed correctly, others are not. The mixed evidence provided by the student response merits 2 points.
1	The student response demonstrates a minimal understanding of the concepts involved in solving problems involving customary units.
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response.

Sample Response:

Part a: 8 feet = 8 × 12 = 96 inches
96 ÷ 2 = 48 hummingbirds

Part b: 16 ÷ 8 = 2. Each chicken egg weighs 2 ounces.
2 × 30 = 60. Each ostrich egg weighs 60 ounces.

Sample Student Responses

Ron's Birds

A. ostrich = 96 inches (8ft x 12 = 96) humming bird = 2 inches

$2\overline{)96}$ = 48

Answer: you can fit 48 humming birds end to end to match the height of an ostrich.

B Chicken egg = 1/8 of lb = 2 oz ostrich 30 x 2 oz = 60 oz.

ostrich egg = 3 3/4 lbs. 16 oz = 1 lb.

3.75 lbs

$16\overline{)60.0}$ = 3.75

48

120

112

80

Score Point: 4

A. 48 humming birds.

B. 60oz. Ostritch egg.

$2 = \frac{1}{8}$

$16 = \frac{1}{12}$

$$\begin{array}{r} 2 \\ \times\ 30 \\ \hline 60 \end{array}$$

- How heavier.

oz.

Score Point: 3

A. 48, because 2X 6 = 12X8=96 6X8 =48

B 3 lbs 12 ozs because 16X 3 = 2X 30 = 60 ÷ 16 = 3 12

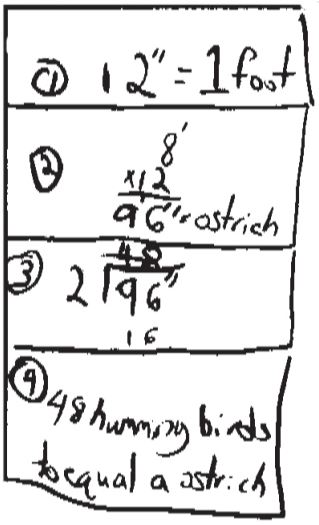
Score Point: 3

a. 12inchs (1ft.)
÷ 2inches
6

6 huming birds in 1ft.
x 8ft height of ostriches
48 huming birds go in one ostrich.

b. 30 Fines heavier than chicken egg
x16 eggs in one pound
180
+300
480 is the weight of an ostrich egg.

Score Point: 2



Score Point: 2

a) about 46, It's just a guess, I dont know what to do.

B) 2 1/2 pounds, also a guess.

Score Point: 1

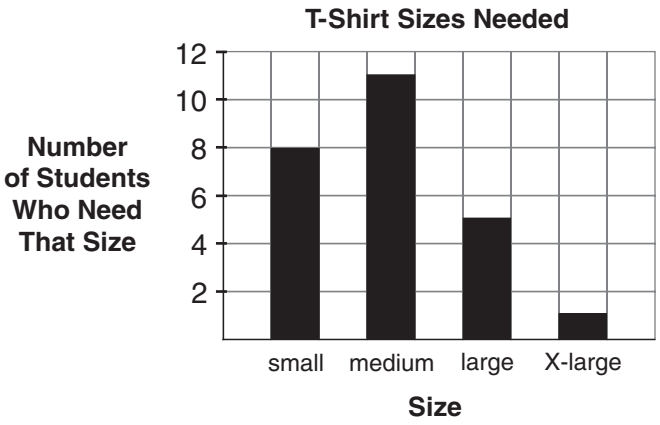
Item 2 T-Shirt Sizes

Standard: MA-06-1.3.01: Number Operations – Students will add, subtract, multiply, and divide whole numbers, fractions, and decimals to solve real-world problems and apply order of operations to simplify numerical expressions.

Bloom's Taxonomy: Analysis

Depth of Knowledge: Level 2

2. Students in Ms. Gwin's class want to order school T-shirts. The number of each size they need is shown on the graph below.



The prices of the T-shirts are shown below.

- $6.00 for a package of 4, all the same size
- $2.50 for each individual shirt

Copy the order form below into your Student Response Booklet.

Order Form

Size	Small	Medium	Large	X-Large
Number of packages of 4 shirts each ($6 per package)				
Number of individual shirts ($2.50 per shirt)				

a. Complete the order form in your Student Response Booklet so that
   - the order includes **at least** all the shirts that are needed and
   - the price of the entire order is the **lowest possible price**.

   Show all your work. Explain how you know that the price of the order is the lowest possible price.

b. What is the price of the entire order? Show or explain how you found your answer.

T-Shirt Sizes

Scoring Guide

Score	Description
4	The student response demonstrates an exemplary understanding of the Number Properties and Operations concepts involved in solving real-world problems that require addition and multiplication of whole numbers and decimals.
3	The student response demonstrates a good understanding of the Number Properties and Operations concepts involved in solving real-world problems that require addition and multiplication of whole numbers and decimals. Although there is significant evidence that the student was able to recognize and apply the concepts involved, some aspect of the response is missing or flawed. As a result the response merits 3 points.
2	The student response demonstrates a fair understanding of the Number Properties and Operations concepts involved in solving real-world problems that require addition and multiplication of whole numbers and decimals. While some aspects of the task are completed correctly, others are not. The mixed evidence provided by the student merits 2 points.
1	The student response demonstrates a minimal understanding of the Number Properties and Operations concepts involved in solving real-world problems that require addition and multiplication of whole numbers and decimals.
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response.

Sample Response:

Order Form

Size	Small	Medium	Large	X-Large
Number of packages of 4 shirts each ($6 per package)	2	3	1	
Number of individual shirts ($2.50 per shirt)			1	1
Total Price	$12	$18	$8.50	$2.50

Since packages are cheaper than 3 or 4 individual shirts, I used packages when the package was cheaper than the number of individual shirts I needed. Total Price: $41.00

Sample Student Responses

T-Shirt Sizes

A

Size	Small	medium	large	X-large
number of packages of 4 shirts each. ($6 per pack)	2	3	2	1
Number of individual shirts ($2.50 per shirt)	8	11	5	1

= 8 packages at $48
-or-
= 25 shirts at $62.50

— or —

	SM	MED	LG	X-LG
packages of 4 shirts at $6 a pack	2	3	1	
individual shirts at $2.50 a shirt			1	1

= $36 for 8 packs
= $5 for 2 shirts

Total price of shirts = $41

B This is the lowest price possible because I didn't spend $6 more dollars for a package when all I needed was one shirt. Two packs of smalls is all I needed because there were 8 shirts even. Three packs of medium is cheaper than two packs and three individuals. One package of large and one individual was cheaper than two packs of large. Only one person wanted x-large so I ordered a single.

Score Point: 4

Size	small	medium	large	x-large
Number of packages of 4 shirts each ($6 per package	2	3	1	0
Number of individual shirts ($2.50 per shirt	0	0	1	1

small = 8 shirts
2 packages = $12 dollars
8 shirts
seperate = $20

medium = 11 shirts
3 packages = $18
1 extra
2 pactges = $12
3 seperate $7.50 $7.50 $19.50

Large = 5 shirts
2 packages = $12
1 package w/ 1 individual = $8.50

X-Large = 1 shirt
1 individual = $2.50
1 package = $6.00

Score Point: 3

size	Small	Medium	Large	X-L
Number of packages of 4 shirts ($6 per package)	2	2	1	0
Number of individual shirts ($2.50 per shirt)	0	3	1	1

Total- 2
2
1
5

5·6=30

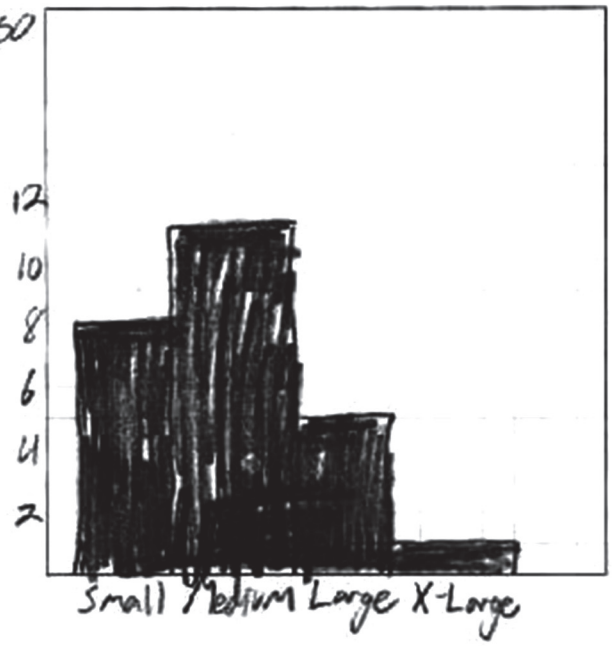
3
1
1
5

5·2.5=12.50

3000
12.50
42.50

Total=$42.50

Small- 4)8 = 2
Medium- 4)11 = 2 R 3
Large- 4)5 = 1 R 1
X-Large- 4)1 = 0 R 1



Score Point: 2

$8+11+5+1=25$

$\$2.50 \times 25 = \$62.5$

$$\begin{array}{r} 6.25 \\ 4\overline{)25} \end{array}$$

$6.25 \times \$6 = \boxed{\$37.5}$

The package of 4 because it is \$25 cheaper.

$62.5 - 37.5 =$
25

Score Point: 1

Item 3 Field Trip

Standard: MA-06-1.3.01: Number Operations – Students will add, subtract, multiply, and divide whole numbers, fractions, and decimals to solve real-world problems and apply order of operations to simplify numerical expressions.

Bloom's Taxonomy: a. Knowledge
b. Analysis

Depth of Knowledge: Level 2

3. A total of 132 sixth-grade students are going on a field trip. They may go by vans only, by buses only, or by vans and buses. The chart below gives information about the two types of vehicles.

Type of Vehicle	Number of Students Vehicle Can Hold	Cost per Day
Van	9	$65
Bus	48	$300

a. List **all** the different combinations of vehicles that can be used to take the 132 students on the field trip. Show your work. (You do not need to count drivers and chaperones.)

b. What is the **least** amount of money that it will cost to use the vehicles to take the students on the field trip? Show or explain how you found your answer.

Field Trip

Scoring Guide

Score	Description
4	The student response demonstrates an exemplary understanding of the Number Properties and Operations concepts involved in solving and justifying real-world problems that require multiplication and addition of whole numbers.
3	The student response demonstrates a good understanding of the Number Properties and Operations concepts involved in solving and justifying real-world problems that require multiplication and addition of whole numbers. Although there is significant evidence that the student was able to recognize and apply the concepts involved, some aspect of the response is missing or flawed. As a result the response merits 3 points.
2	The student response demonstrates a fair understanding of the Number Properties and Operations concepts involved in solving and justifying real-world problems that require multiplication and addition of whole numbers. While some aspects of the task are completed correctly, others are not. The mixed evidence provided by the student merits 2 points.
1	The student response demonstrates a minimal understanding of the Number Properties and Operations concepts involved in solving and justifying real-world problems that require multiplication and addition of whole numbers.
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response.

Sample Response:

# Buses	# Vans	# Passengers	Cost
3	0	144 + 0 = 144	900 + 0 = $900
2	4	96 + 36 = 132	600 + 260 = $950
1	10	48 + 90 = 138	300 + 650 = $950
0	15	0 + 135 = 135	0 + 975 = $975

Part a: 3 buses – 0 vans, 2 buses – 4 vans, 1 bus – 10 vans, 0 buses – 15 vans

Part b: 3 buses with 0 vans cost $900.
2 buses with 4 vans cost $860.
1 bus with 10 vans cost $950.
0 buses with 15 vans cost $975.

Sample Student Responses

Field Trip

a.

bus	vans
3	0
2	4
1	10
0	15

b

bus	vans	$
3	0	900
2	4	860
1	10	950
0	15	975

the best way is 2 buses 4 vans = $860

Score Point: 4

a) $9\overline{)132}$ 14 r.6
-9
3412
-36
6

$48\overline{)132}$ 2
-96
36

2
48
+3
144
-132
12

1
48
+48
96
+96
192
-132
060

- 15 vans with 3 seats extra
- 3 buses with 12 seats extra
- 2 buses with 4 vans to have exactly 132 students fit in 6 vehicles.

b) By using 2 buses and 4 vans you can fit 132 students in 6 vihicles and pay less. By using only 2 buses and 4 vans you have to pay $860.00 dollars, but if you use 3 buses to try fit 132 students you'll waste 900 dollars, and by using vans you'll waste more

b)
2
65
+15
325
+650
$975

300
× 3
$900

300
× 2
$600
+260
$860

2
65
× 4
$260

Score Point: 3

a – 10 vans = 90 students
1 bus = 48 students = 138

2 buses = 96 students
4 vans = 36 students = 138

b – 2 buses = $600
4 vans = $260
$860

the least they will spend is $860.00 because that holds exactly 138 students.

Score Point: 2

A: 48 96 105 114 123 132

bus, bus, van, van, van, van

A = 2 buses + 4 vans

B: 300
+ 300
600

65
65
+ 65
260

600
+ 260
860

B = 860 dollars because

600
+ 260
860 $

Score Point: 1

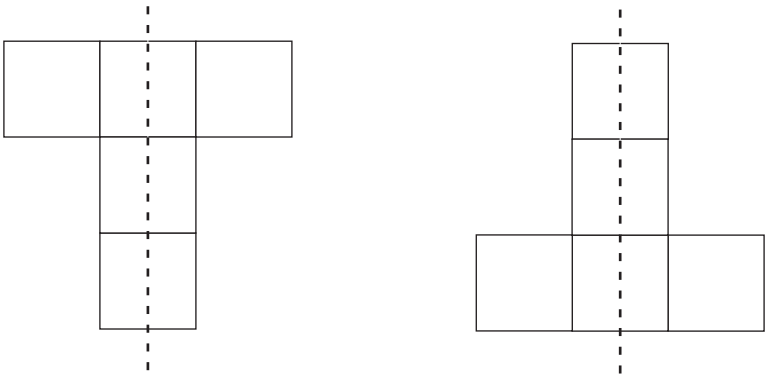
Item 4 Symmetry

Standard: MA-06-3.2.01: Transformations of Shapes – Students will describe, provide examples of, and apply line symmetry to real-world and mathematical problems.

Bloom's Taxonomy: Application

Depth of Knowledge: Level 3

Use the picture below to answer question 4.

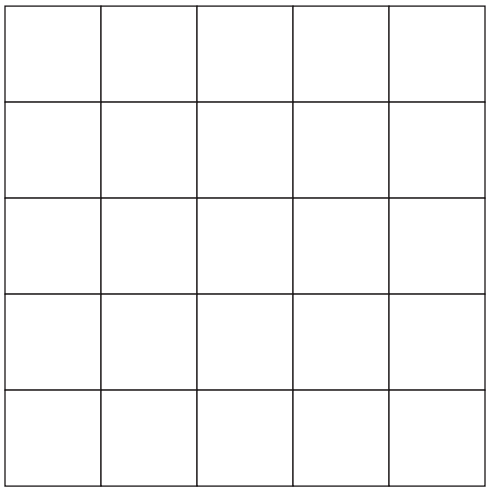


(Note: These are the same shape.)

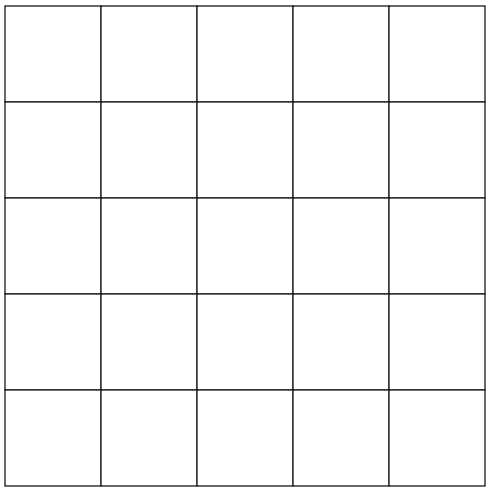
4. The five squares shown above are arranged so that the figure has only one line of symmetry. Use the following rule to answer parts a through d.

   Rule: Each square must share at least one complete side with another square.

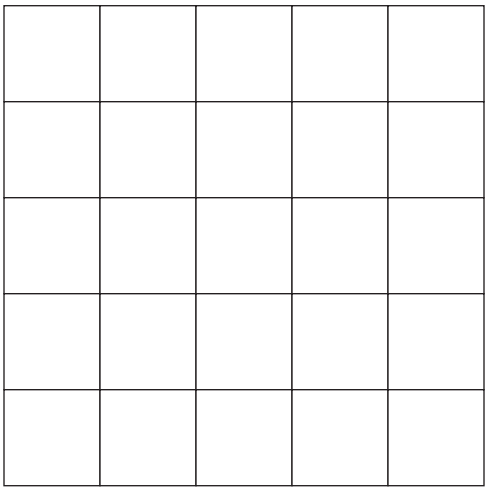
   a. In your Student Response Booklet, draw an arrangement of five squares that is different than the shape shown above and has only **one line of symmetry**. Include the line of symmetry in your drawing.



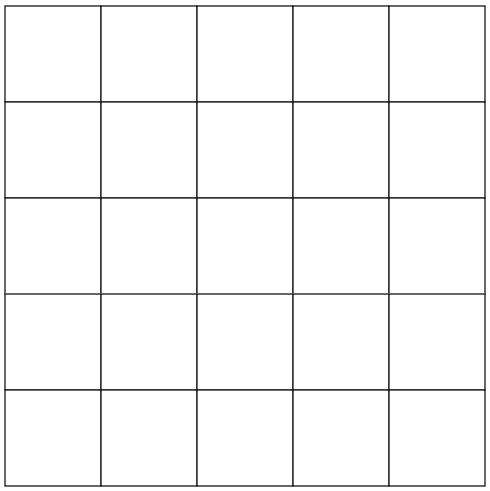
b. Draw an arrangement of five squares that has only **two lines of symmetry**. Include the lines of symmetry in your drawing.



c. Draw an arrangement of five squares that has only **four lines of symmetry**. Include the lines of symmetry in your drawing.



d. Draw an arrangement of five squares that has **no lines of symmetry**.



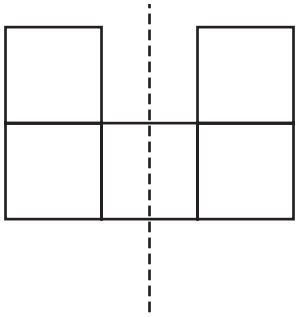
Symmetry

Scoring Guide

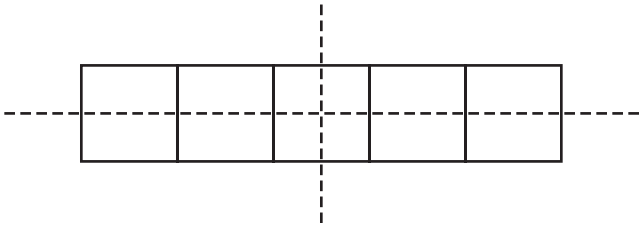
Score	Description
4	The student response demonstrates an exemplary understanding of the concepts involved in providing examples of symmetric figures made up of five congruent squares with different numbers of lines of symmetry.
3	The student response demonstrates a good understanding of the concepts involved in providing examples of symmetric figures made up of five congruent squares with different numbers of lines of symmetry. Although there is significant evidence that the student was able to recognize and apply the concepts involved, some aspect of the response is missing or flawed. As a result the response merits 3 points.
2	The student response demonstrates a fair understanding of the concepts involved in providing examples of symmetric figures made up of five congruent squares with different numbers of lines of symmetry. While some aspects of the task are completed correctly, others are not. The mixed evidence provided by the student merits 2 points.
1	The student response demonstrates a minimal understanding of the concepts involved in providing examples of symmetric figures made up of five congruent squares with different numbers of lines of symmetry.
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response.

Sample Response:

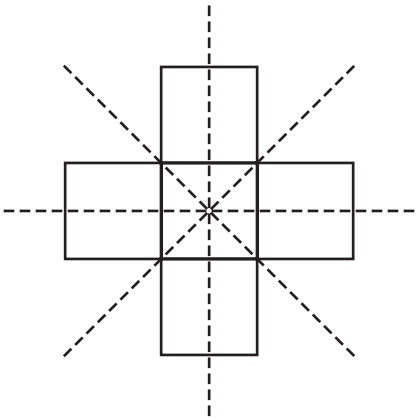
Part a:



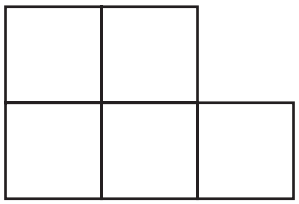
Part b:



Part c:

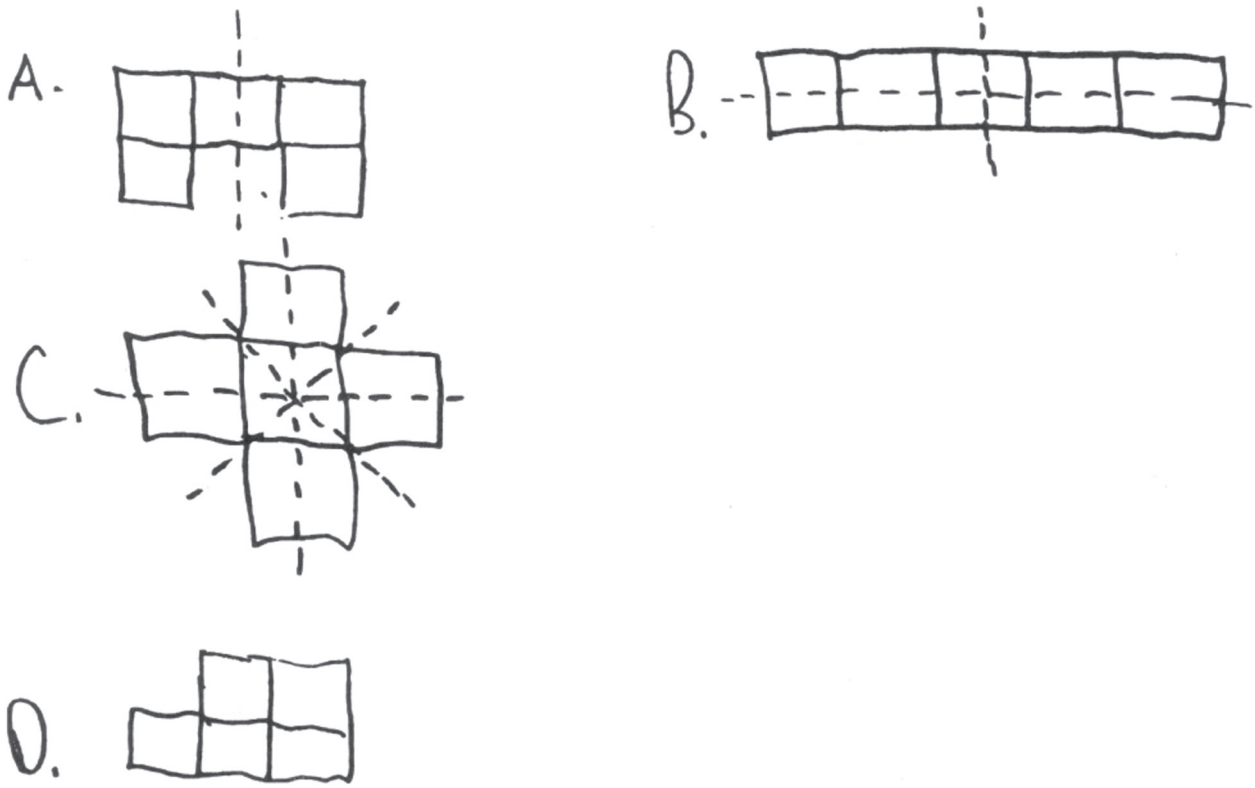


Part d:

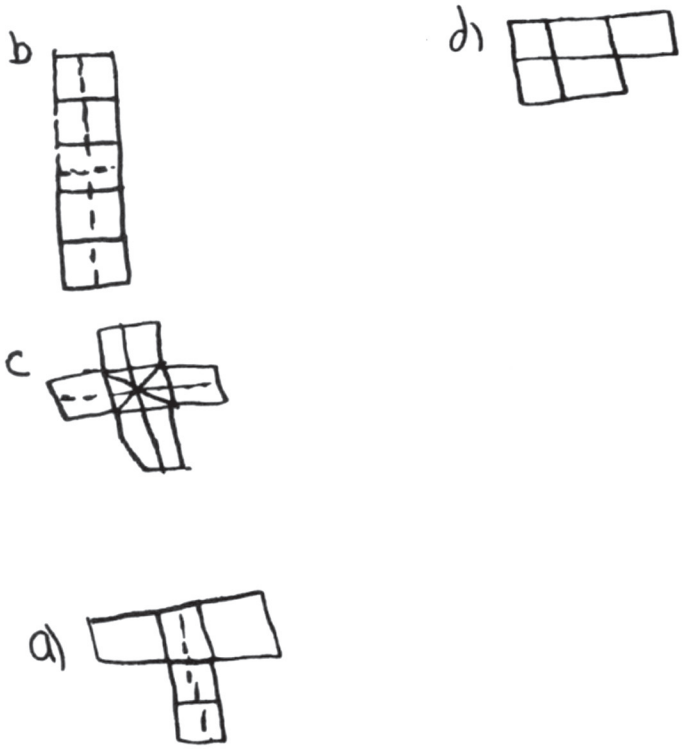


Sample Student Responses

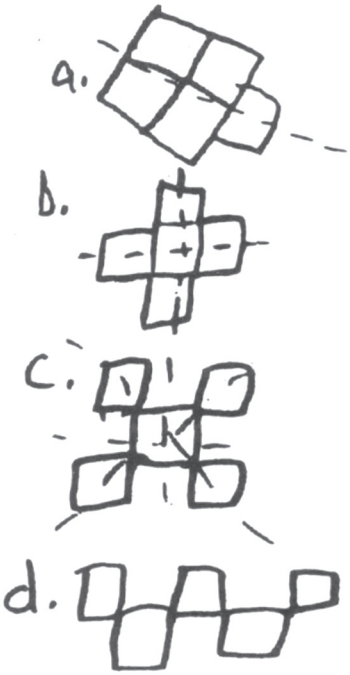
Symmetry



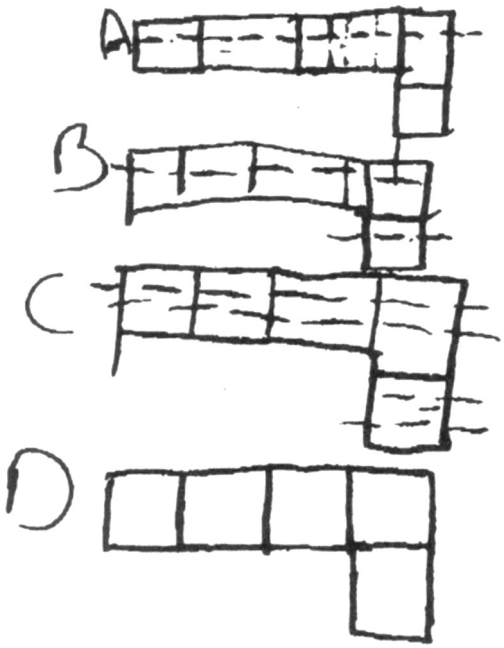
Score Point: 4



Score Point: 3



Score Point: 2



Score Point: 1