2007

Green River

Regional Educational Cooperative

Grade 4

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 Trapezoids and Triangles

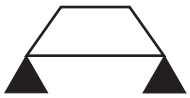
Standard: MA-04-5.1.01: Patterns, Relations, and Functions – Students will extend patterns (e.g., 108, 208, 308, 408, . . .) from real world and mathematical problems; compare simple patterns (e.g., numbers, pictures, words) and describe rules for simple number patterns (e.g., 1, 3, 4, 7, . . .; 5, 10, 15, 20, . . .; 30, 27, 24, 21, . . .).

Bloom's Taxonomy: a. Comprehension
b. Application

Depth of Knowledge: Level 3

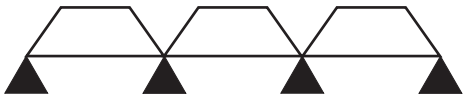
Trapezoids and triangles were used to make a pattern.

Level 1:



Level 2:

Level 3:



1. a. Fill in the chart in your Student Response Booklet to show how many trapezoids and triangles are used to build each level. Decide how many trapezoids and triangles would be needed to build Levels 4 and 5, and record the numbers in your chart. The first level in the chart has been completed for you.

   b. If the pattern above continues, how many TRAPEZOIDS are needed to build Level 10? Explain how you know you are right.

   c. If the pattern above continues, how many TRIANGLES are needed to build Level 10? Explain how you know you are right.

Trapezoids and Triangles

Scoring Guide

Score	Description
4	The student response demonstrates an exemplary understanding of the concepts involved in extending patterns from mathematical problems.
3	The student response demonstrates a good understanding of the concepts involved in extending patterns from mathematical problems. 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 extending patterns from mathematical problems. 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 extending patterns from mathematical problems.
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response.

Sample Student Responses

Trapezoids and Triangles

a,

H.

	Mu Number of ▱	Number of ▲
Level 1	1	2
Level 2	2	3
Level 3	3	4
Level 4	4	5
Level 5	5	6

b. 10

c. 11 I know, because, I made Level 10, then I counted the triangles for Level 10 and there were 11 triangles

Score Point: 4

a.

	▱	△
L1	1	2
L2	2	3
L3	3	4
L4	4	6
L5	5	6

10. Becahse every level B. has a new trapezoid.

11. Becahse the frist one C. 2.

Score Point: 3

You need 10
trapezoids.

You need 11
triangles. I know
because I counted
them!

Score Point: 2

L = Level

A.

	Number of ▲	Number of △
L1	1	2
L2	2	3
L3	3	4
L4	4	5
L5	5	6

B. You need 10 trapezoids because you need one trapezoid for each level 1x10 = 10. Thats why you need 10 trapezoids.

C. You need 20 triangles because you need two triangles to make a Level and you need 10 trapezoids to make a level so 10x2 = 20. Thats how I got my answer.

Score Point: 2

G.

(a)

	Number of ⏢	Number of ▲
Level 1	1	2
Level 2	2	3
Level 3	3	4
Level 4	4	5
Level 5	6	7
level 6	7	8
level 7	9	10
level 8	10	11
level 9	11	12
level 10	12	13

(b.) Their are 12 ⏢ in level 10

(c.) Theirare 13 ▲ in level 10.

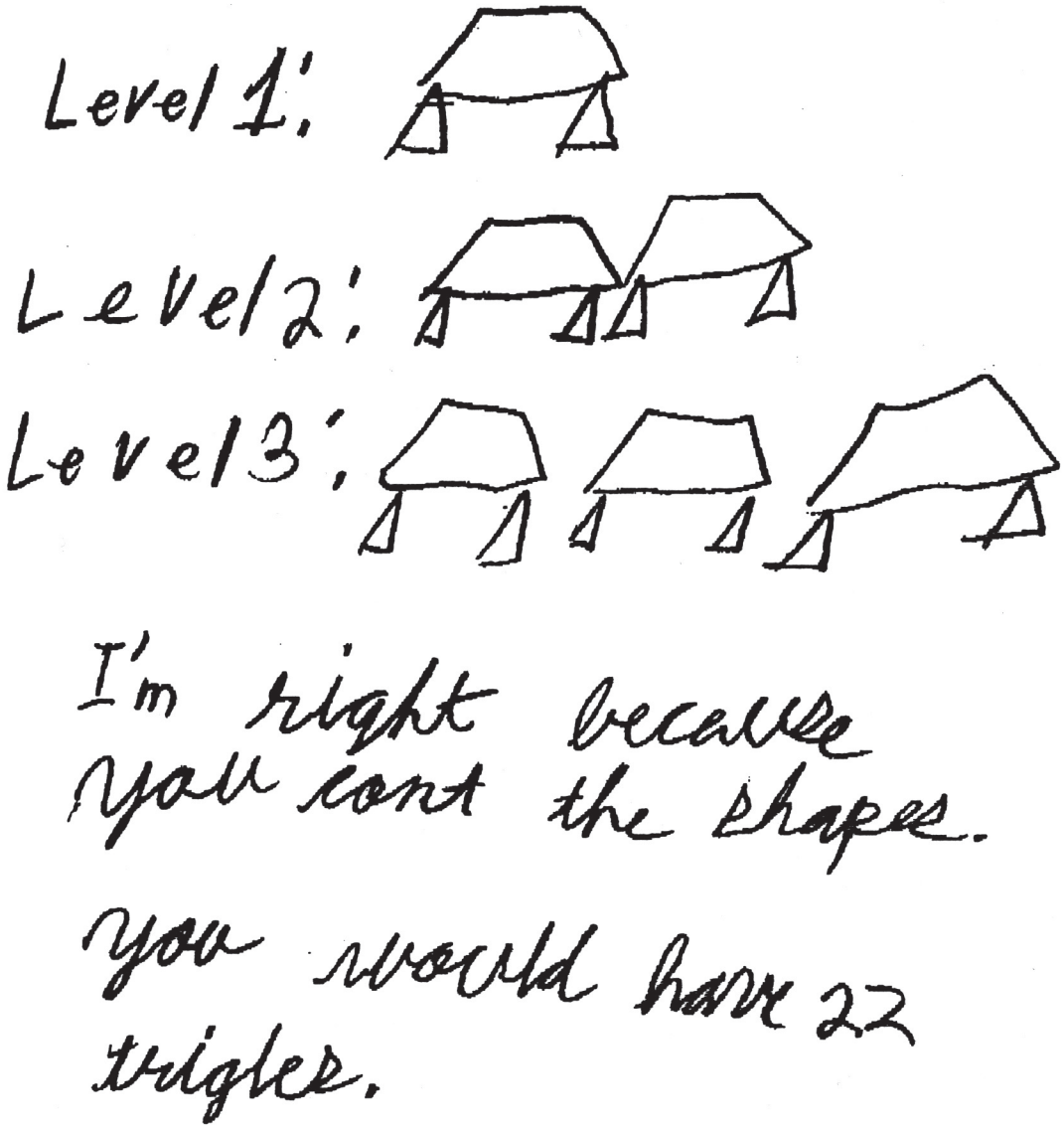
Score Point: 2

	Number of ⏢	Number of △
Level 1	1	2
level 2	2	4
level 3	3	6
level 4	4	8
level 5	5	10

10 Trapezoids will be needed to build level 10

20 Triangles will be need to build level 10

Score Point: 1



Score Point: 0

Item 2 Jacob's Chores

Standard: MA-04-1.5.01: Properties of Numbers and Operations – Students will identify and determine odd numbers, even numbers, multiples of a number, and composite factors of a number, and will apply these numbers to solve real-world problems.

Bloom's Taxonomy: a. Comprehension
b. Application

Depth of Knowledge: Level 2

2. Jacob's mother made the schedule shown below for Jacob's chores for the first 60 days of summer vacation.
   - Walk the dog every 2nd day starting on day 2.
   - Brush the dog every 3rd day starting on day 3.
   - Water the plants every 4th day starting on day 4.

   a. On what day will Jacob first walk **and** brush the dog? Show or explain how you found your answer.

   b. On what day will Jacob first do **all three** chores? Show or explain how you found your answer.

   c. How many times in the 60 days will Jacob do all three chores on the same day? Show or explain how you found your answer.

Jacob's Chores

Scoring Guide

Score	Description
4	The student response demonstrates an exemplary understanding of the Number Operations and Procedures concepts involved in determining multiples of numbers to solve real-world problems.
3	The student response demonstrates a good understanding of the Number Operations and Procedures concepts involved in determining multiples of numbers to solve real-world problems. 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 Operations and Procedures concepts involved in determining multiples of numbers to solve real-world problems. 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 Operations and Procedures concepts involved in determining multiples of numbers to solve real-world problems.
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: 6 because 6 is the least common multiple of both 2 and 3.

Part b: 12 because 12 is the least common multiple of 2, 3, and 4.

Part c: 5 times. He will do all three chores on days 12, 24, 36, 48, and 60.

Sample Student Responses

Jacob's Chores

walk dog on day 2,4,6,8,10

a.) on the 6th day

brush his dog on day 3,6,9,12

b.) on the 12th day

walk dog on day 2,4,6,8,10,12
Brush dog on day 3,6, 12,15,18
water plants on day 4,8,12,16

c.) 5 times

water 4 8 12,16,20 24 28 32 36
plant 40 44 48 52 56 60

walk dog 2,4,6,8,10,12,14,16,18,20,22,
24,26,28,30,32,34,36,
38,39,40,42,44,46,48,50,
52,54,56,58,60

brush dog 3,6,9,12,15,18,21,24,27,30,33,36,39,42,45,48,51,54,57,
60

Score Point: 4

A) 2+2+2=6
3+3=6 = day 6

B.) 4+4+4=12
2+2+2+2+2+2=12 = day 12
3+3+3+3=12

C.) 4x6=24 = day 24
3x8=24
2x12=24
only 2 times and
day 12 and on day
24.

Score Point: 3

(a.) Day 6 he will do both. I found this by listing their least common multiples.

2, 4, 6
3, 6

(b.) Day 12 he will do all three This is because they all have the multiple of 12 in common.

2, 4, 6, 8, 10, 12
3, 6, 9, 12
4, 8, 12

(c.) He will do all 4 times in 60 days.

2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60

3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, 36, 39, 42, 45, 48, 51, 54, 57, 60, 63, 66

4, 8, 12, 16, 20, 24, 28, 32, 36, 40, 44, 48, 52, 56, 60

Score Point: 3

A. Seconds and first day. It tells you.

B. 5th day. It goes in order.

C.

$$\begin{array}{r} 12 \\ 5\overline{)60} \\ -50 \\ \hline 10 \\ -10 \\ \hline 0 \end{array}$$

12

Score Point: 2

(a) Day 12 will be the first day Jacob does both
I found this out with a comparsine.
(b) Day 12 will also be the day he does
all 3 I found this out by a graph
(c) 8 times he will do all 3 I found
this out by graph

Score Point: 1

a. Jacob can't brush and walk the dog on 2 days. So I picked day 4.

b. Jacob can do his chores on the 4th day because he dint do it on day 2 or 3.

c. 1,218,240. First, I multiply 234 × 60. Next, I figure out the answer.

Score Point: 0

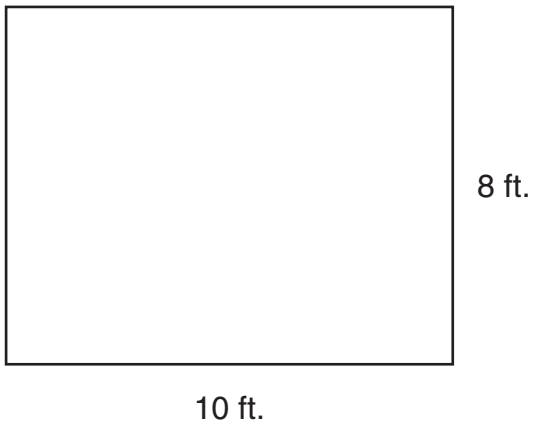
Item 3 Ricardo's Garden

Standard: MA-04-2.1.01: Measuring Physical Attributes – Students will apply standard units to measure length (to the nearest quarter-inch or nearest centimeter) and to determine: weight (ounce, pound; gram, kilogram); perimeter; area (figures that can be divided into rectangular shapes); time (nearest five minutes); and temperature (Fahrenheit and Celsius).

Bloom's Taxonomy: Application

Depth of Knowledge: Level 3

3. Ricardo has exactly enough fencing to go around the rectangular garden shown below.



a. How many feet of fencing does Ricardo have? Show or explain how you found your answer.

b. What is the area in square feet of the garden shown above? Show or explain how you found your answer.

c. Maria has the same amount of fencing as Ricardo has.

- She made a rectangular garden that is only 6 feet wide.
- She used all her fencing.

What is the length in feet of Maria's garden? Show or explain how you found your answer.

BE SURE TO LABEL YOUR RESPONSES a, b, AND c.

Ricardo's Garden

Scoring Guide

Score	Description
4	The student response demonstrates an exemplary understanding of the Measurement concepts involved in determining area and perimeter to solve real-world problems.
3	The student response demonstrates a good understanding of the Measurement concepts involved in determining area and perimeter to solve real-world problems. 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 Measurement concepts involved in determining area and perimeter to solve real-world problems. 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 Measurement concepts involved in determining area and perimeter to solve real-world problems.
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response.

Sample Response:

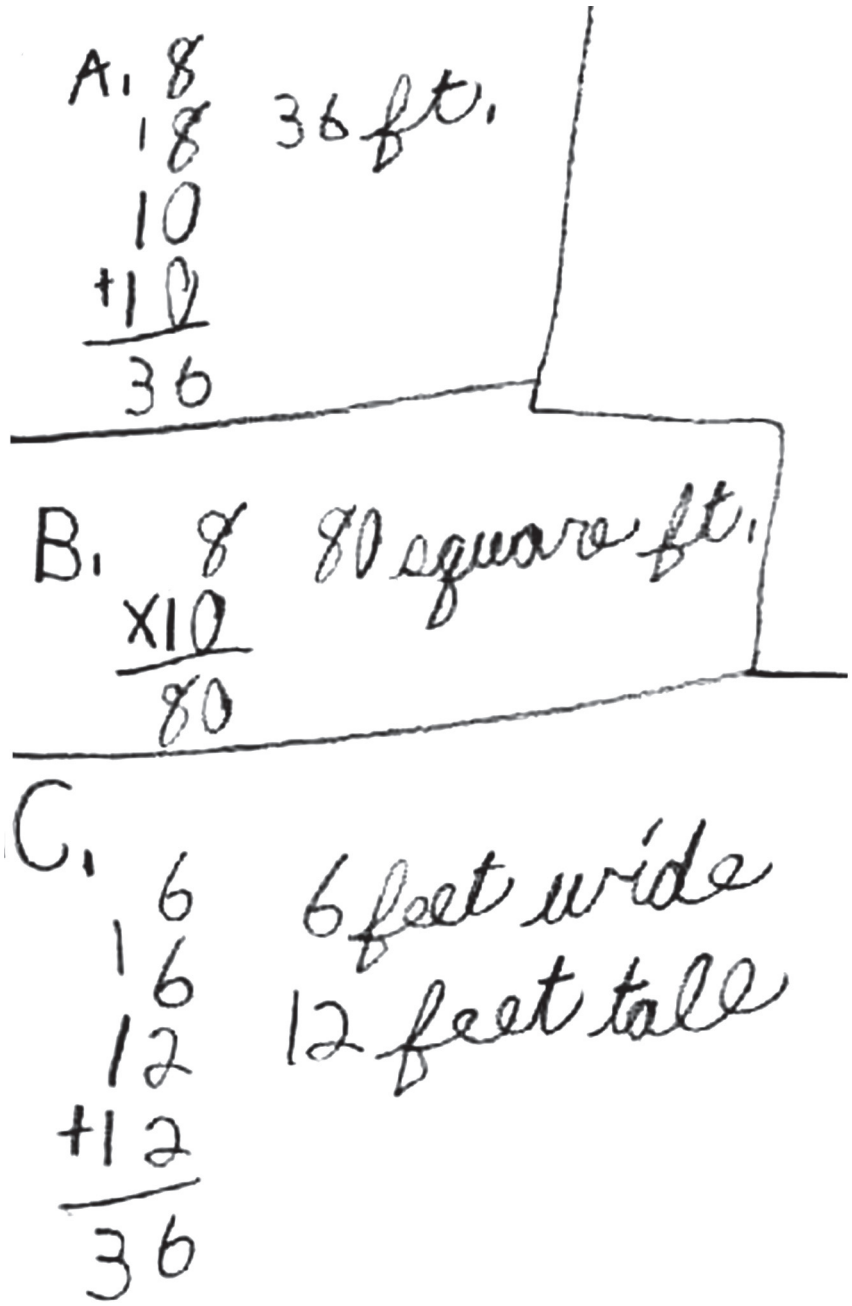
Part a: 36 feet because 10 + 8 + 10 + 8 = 36.

Part b: 80 square feet because 10 × 8 = 80.

Part c: 12 feet. Ricardo and Maria both used 36 feet of fencing. Maria's garden is 6 feet long, so she used 12 feet for the widths. That left 36 – 12 = 24 feet for the two lengths, and 24 ÷ 2 = 12.

Sample Student Responses

Ricardo's Garden



Score Point: 4

A. Ricardo has 36 feet of fencing.

B. The area is 80 sq. feet and I got the answer by 8x10 so it will equal 80.

C. The length of Maria's garden is 13 because 6+6=12 so 36-12=24 and then 24÷2=12.

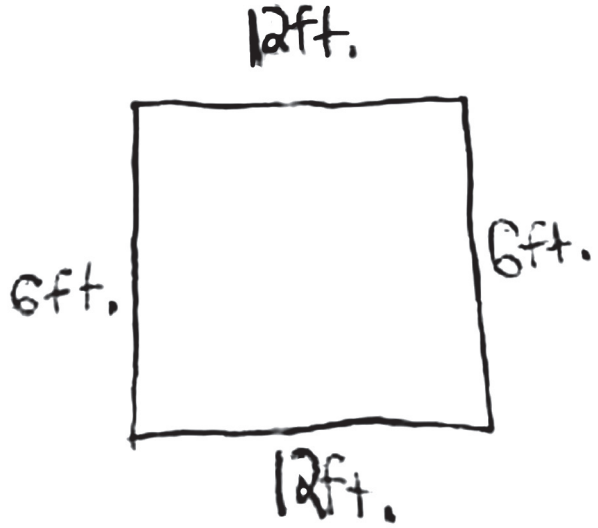
$$\begin{array}{r} 1 \\ 10 \\ 10 \\ 8 \\ +\ 8 \\ \hline 36 \end{array}$$

Score Point: 3

A. 8+8+10+10=36

b. 80

c. 6+6+12+12=36



Score Point: 3

a) Ricardo has 36 ft. of fencing. I did the length x 2 + then the width x2. After that I added them together.

b) 80 ~~ft.~~ = area. I did the length x the width.
example:
l x w = area

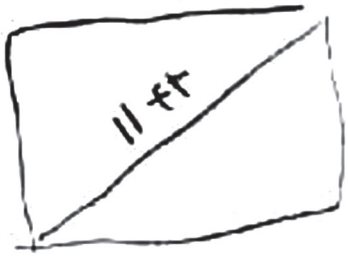
c) 6ft. long. 6 ft + 36 ft. (from above) I did 36 ÷ 6 + I got 6ft. long.

Score Point: 2

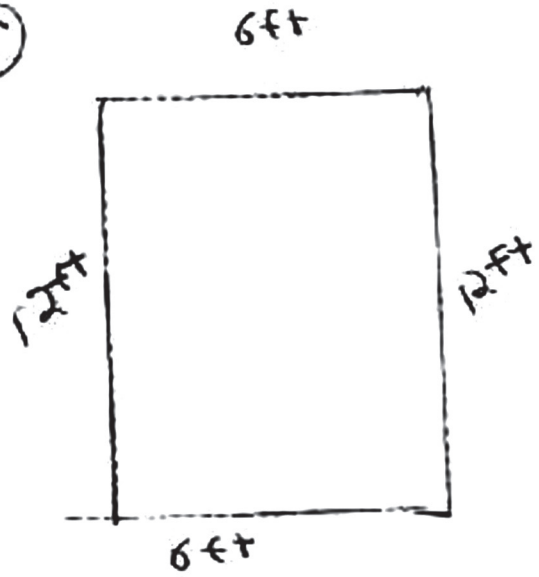
Ricardo has 36 ft of fencing

a. 2 × 10 ft = 20 ft
2 × 8 Ft = 16 ft
+
36 ft

b. 11 ft



c.



36
12
24
you half that

Score Point: 2

a. He has 116 ft. of fencing. 10x10x8x8=116.
b. 80 square feet. 8x10=80.
c. Maria's garden is 60 ft. 6x10=60.

Score Point: 1

A
$$\begin{array}{r} 10 \\ 10 \\ + \quad 8 \\ 8 \\ \hline 46 \end{array}$$

B
$$\begin{array}{r} 10 \\ 10 \\ 16 \\ \hline 46 \end{array}$$

C
$$\begin{array}{r} 6 \\ 6 \\ \hline 12 \\ 10 \\ 10 \\ \hline 32 \end{array}$$

32 ft

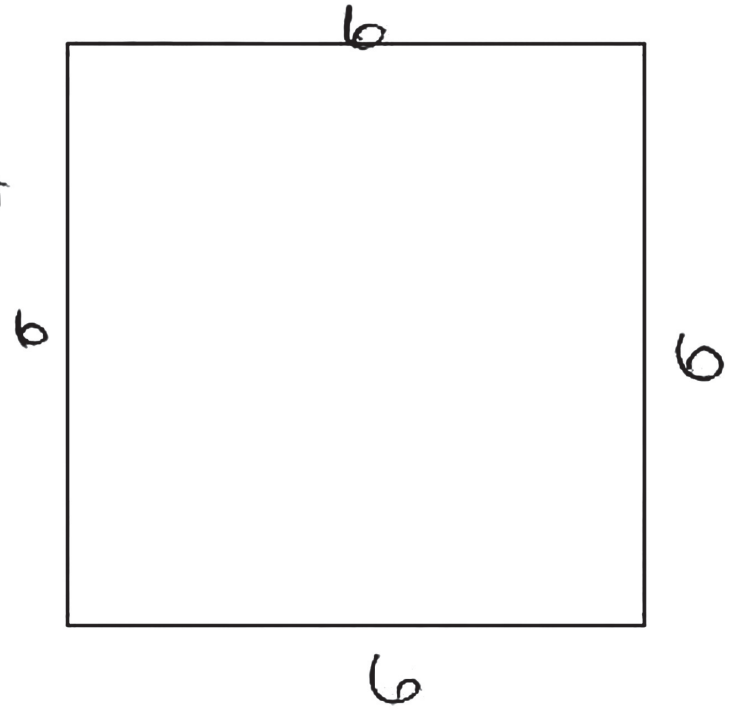
Score Point: 1

a. 8 because if he puts it all around he would have to add 8+10= which is 80 feet

B
10+10=20
8+8= 16
36 feet

12+12=24 feet

Because you have to add all sides.



Score Point: 0

Item 4 Product Patterns

Standard: MA-04-5.1.01: Patterns, Relations, and Functions – Students will extend patterns (e.g., 108, 208, 308, 408, . . .) from real world and mathematical problems; compare simple patterns (e.g., numbers, pictures, words) and describe rules for simple number patterns (e.g., 1, 3, 4, 7, . . .; 5, 10, 15, 20, . . .; 30, 27, 24, 21, . . .).

Bloom's Taxonomy: Comprehension

Depth of Knowledge: Level 3

Use the pattern below to answer question 4.

	Product
$2 \times 2 =$	4
$2 \times 2 \times 2 =$	8
$2 \times 2 \times 2 \times 2 =$	16
$2 \times 2 \times 2 \times 2 \times 2 =$	32

You can find the next product in the pattern by doing the multiplication shown below.

2 × 2 × 2 × 2 × 2 × 2 =

4. a. Show or describe an easier way to find this product.

   b. What are the next THREE products?

   c. If the pattern shown continues, could 375 be one of the products in the pattern? Explain how you know.

   BE SURE TO LABEL YOUR RESPONSES (a), (b), AND (c).

Product Patterns

Scoring Guide

Score	Description
4	The student response demonstrates an exemplary understanding of the concepts involved in extending patterns and describing rules for patterns from a mathematical problem.
3	The student response demonstrates a good understanding of the concepts involved in extending patterns and describing rules for patterns from a mathematical problem. 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 extending patterns and describing rules for patterns from a mathematical problem. 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 extending patterns and describing rules for patterns from a mathematical problem.
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response.

Additional Notes

For Part b, also accept 128, 256, 512 as a correct answer (based on the "next product" after the expression provided in the item rather than the product following 32).

Sample Responses:

Part a: double the number for the pattern before

Part b: 64, 128, 256 OR 128, 256, 512

Part c: No because 375 is not an even number so it doesn't fit in this pattern of even numbers.

OR

No because it skips from 256 to 512.

Sample Student Responses

Product Patterns

(A.)

$$\begin{array}{r} 32 \\ \times\ 2 \\ \hline 64 \end{array}$$

(B.) The next 3 products are 128, 256, and 512.

C. No 37s can't be in the pattern because it doen't come up with the other numbers.

$$\begin{array}{r} 32 \\ \times\ 2 \\ \hline 64 \\ \times\ 2 \\ \hline 128 \end{array} \qquad \begin{array}{r} 128 \\ \times\ 2 \\ \hline 256 \\ \times\ 2 \\ \hline 512 \end{array}$$

Score Point: 4

(a) The next three products are 64, 128, and 256 because there is a pattern that doubles the number. (B) 375 could not be one of the numbers because you would have to double 256 and that equals 512.

Score Point: 4

32 x 2 = 64 x 2 = 128 x 2 = 256 x 2 = 512

it would not be because I x it and got 512.

2
2
4
3
3
6

1 1
256
x 2
512

Score Point: 3

(A)

Adding the problem up in your head!

(B)

2 × 2 × 2 × 2
2 × 2 × 2 = 128

256

512

(C)

No; because if the pattern did go on the number 256 would have to be 375 if that was in the pattern.

Score Point: 3

A 2x2x2x2x2x2 = 64

B The sixth product is 128
The seventh product is 251
The eighth product is 512

C 375 wouldn't be in the pattern because 2+2 is 4 and 4+4 is 8 and 8+8 is 16 and 16+16 is 32 and 32+32 is 64 and 64+64 is 128 and 128+128 is 256 and 256 and is 512

Score Point: 3

(a) 2×2×2×2×2×2 = $\boxed{64}$

(b) 128, 256, 412

(c) no because it goes from 256 to 412

64
64
128

128
128
256

256
256
412

Score Point: 2

a. 2x2x2x2x2x2=64

B 2x2x2x2x2x2x2x2x2=512

C. no because it has to end with a multipule of two.

Score Point: 1

B 7X2=
8X2=
9X2=

C No, it would not be.

Score Point: 0